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DIFFERENTIAL DIAGNOSIS OF PAIN IN THE CHEST

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Toronto

IN this discussion the term "pain" will be used to include all uncomfortable sensations, such as fullness, tightness, constriction, burning, numbness or pressure, as well as actual pains of various sorts. The term "chest" will include the cardiac area for pain, which extends from the third cervical above to the eighth dorsal below. This includes the arms, the whole of the anterior part of the chest, but, posteriorly, only that part above the eighth interspace, the neck and the upper part of the epigastrium. Anginal pain does, although rarely, overflow this area above and radiate to parts of the face and mouth. Investigation of such pains forms the most frequent and important of the problems dealt with by physicians specially interested in cardiac disease. During the last fifteen months of practice over 600 such cases, all new, have come into the office for consultation. Old cases or repeats are excluded in this series, as it is desired to give as truly as possible the proportional number of each cause. Including repeats would give an undue proportion of coronary cases.

Of this group 225 had pain that was considered to be of cardiac origin, *viz.*, 37.4 per cent. So that, if the average patient thinks he has a cardiac pain the chances are nearly two to one that this is not so. Of this 225 group, 87 had angina only; 73 had coronary occlusion only; 47 others had both coronary thrombosis with angina, either before or after, or both; and the remaining 18 had pain due to other forms of heart disease. Of these 18, four had angina due to aortic valve disease; 1 had angina due to luetic aortitis; 3 had pain during attacks of paroxysmal tachycardia; 3 cases were due to pericarditis, 1 to coronary embolism, 1 to contusion of the heart, 1 to disordered action of the heart, and the remaining 4 to various other forms of valvular disease. Thus, 207 out of 225, or 92 per cent of the cases with cardiac pain, had coronary disease as its cause.

Of the non-cardiac group of 392 cases the pain in 201, or roughly 50 per cent, was due to root involvement by spondylitis. In these cases the diagnosis of spondylitis was certain, and in many of them some spinal movement induced the pain of which they complained. In another 35 the diagnosis of spondylitis was probable, because of the type of the pain. In 52 cases, however, or 8 per cent of the total 600, no cause whatever was found for the pain, which was certainly non-cardiac in origin, because the pains were unlike cardiac pains in location, duration and character, and the heart was normal functionally, anatomically and electrocardiographically. It is probable that most of this group also had pains of spondylitic origin. This group is very similar to the second group, excepting that in this one there was less arthritic evidence. A case was put in the second group, and labelled probably spondylitic, when there were pains in a variety of places, such as down the arms or down the legs or in several different places in the chest, or if there were a history of lame back or arthritis in other situations, when on physical examination there was no limitation of movement or pain on spinal movements. No x-ray plates were taken to demonstrate spondylitis, because the diagnosis was not considered important enough to justify the expense to the patient.

The next group in the non-cardiac division, 43 in number, had shoots or stabs of pain like pin-pricks, that is, pains lasting only a second

or so, which usually came in various places on the left side of the front of the chest. In 15 of these 43 no associated disease was demonstrable; 9 were noted to have spondylitis; 6 had various forms of valvular disease; 2 had disordered action of the heart; and 1, tuberculosis. It is my impression that this form of pain is relatively more common than the figure (7 per cent of all chest pains) would indicate, because its mention was omitted in many histories on account of its insignificance. I am strongly of the opinion that this form of pain is never due to coronary disease. A reasonable explanation, however, of these little stabs is extremely difficult and will not be ventured.

Only 14 of the non-cardiac group had pain due to gall-bladder disease, with or without gall stones. This number is obviously much too small. These 14 are merely the total number of cases in which someone thought the pain might be of cardiac origin, but which, however, on investigation turned out to be due to gall-bladder disease, the heart being entirely normal. The 14 do not include any of the cases of cholecystitis which accompanied the 207 cases of coronary disease, of which there must have been many. The question of how many patients with angina or coronary occlusion had associated gall-bladder disease was not investigated, although quite a large number had pains due to both.

A miscellaneous group of 25 cases had chest pains due to pleurisy, including pneumonia, and carcinoma of the bronchus, local injury, cancer of the breast, aneurysm, spinal curvature, globus hystericus, cardiospasm and duodenal ulcer. A final 22 represents a group in which no definite decision could be arrived at, but most of which were cases having pain that might have been cardiac, because heart disease was present with no other demonstrable cause for pain. This group includes cases of which the following are examples.

A man, aged 50, with mitral stenosis and auricular fibrillation, with a good exercise tolerance, had had constant pain around the left nipple for four years, unaffected by walking, but made worse by fatigue or by lying on the left side.

A woman, aged 64, had had three attacks in five months, commencing with a sharp stab of pain, for a few seconds only, in the left breast, followed by weakness and unconsciousness for half an hour. Vomiting occurred in one attack. Physical, x-ray and electrocardiographic examinations were all negative. The heart was said to be very fast during the attacks. However, she could walk two or three miles on the level at an ordinary gait comfortably. These cases might have been paroxysmal tachycardia.

A patient with hypertensive heart disease, pulsus alternans, and congestive failure had two attacks of pain across the top of both shoulders behind, above the scapular spines, which lasted all day and occurred two weeks apart.

During this same period 38 cases of congestive failure, 70 cases of chronic valvular disease, and 40 cases of paroxysmal tachycardia were seen as new cases in the office, all without pain. These figures indicate that about 7 or 8 per cent of cases of paroxysmal tachycardia produce cardiac pain, and that real cardiac pain in chronic valvular disease is rare. Associated spondylitic pain was found to be as common with valvular disease as was pain that might have been cardiac, such as in the cases cited above. A review of the above case histories showed that 5 per cent of the cases of angina and coronary thrombosis had other associated pains due to spondylitis. This figure is probably too low, because in some cases no mention was made of the latter pains on account of their relative unimportance.

Someone is going to wonder at the relative infrequency of pains due to syphilitic aortitis in this series, only one having been mentioned. It should therefore be explained that in office, and also in hospital practice, syphilitic aortitis is becoming more and more uncommon in Ontario. In the Toronto General Hospital twenty years ago, 12 per cent of those admitted had positive Wassermann reactions. Due to various measures, public health and others, this figure has gradually declined, until last year it was down to 1.9 per cent. It is now becoming difficult to find cases of syphilitic aortitis to show to medical students.

When investigating cases with chest discomforts, it is well to have in mind a classification of their possible causes, somewhat similar to the following.

A. Pains Due to Disease in the Chest Wall

1. Root neuritis, secondary to spondylitis.
2. Local neuritis, such as herpes zoster. The rash of this disease may be delayed as long as five weeks, or may not appear at all.
3. Involvement of the vertebral bodies by inflammation, tuberculosis, or new growth. These produce similar pains to vertebral arthritis, but are usually more severe, persistent and progressive. To avoid dismissing these cases as spondylitis it is very important to have radiographs made in suspected cases.
4. Local disease in the chest wall, such as chronic mastitis, new growth, injury or local tuberculosis.
5. Fractured rib. A fractured rib sometimes occurs, not due to direct violence. The writer saw three

such cases in one year, one due to a severe paroxysm of coughing, one to an asthmatic attack, and the third to a vigorous embrace.

6. Meningeal involvement from tumour, aneurysm or other disease within the spinal canal.

7. Idiopathic. There are many cases of a pain, especially in the region of the left breast, for which one cannot find the slightest suspicion of a cause. Many of the above so-called shoots or stabs fall in this group. One hesitates to mention fibrositis, because of the difficulty of certain diagnosis, unless one can feel small tender nodules. Pleurodynia, myalgia and intercostal neuralgia are not diagnostic terms. They are only used to indicate a pain of uncertain origin, and are useless, except to cover our inability to make a diagnosis.

B. Pains Due to Visceral Disease

1. Pleural pain is unilateral. Most of the causes of pleural pain are easily distinguished from heart disease. Coronary thrombosis has been mistaken for pneumonia when pulmonary infarction or pleural effusion occurred early. A spontaneous pneumothorax sometimes produces symptoms very like coronary thrombosis—the pain, rapid pulse, slight fever, etc. Complete pneumothorax is easily diagnosed by physical examination. A partial pneumothorax, however, may be very difficult to distinguish on physical examination, and may require stereo plates. A most difficult problem occasionally arises after an operation, to distinguish pulmonary embolism from coronary thrombosis. Points in favour of pulmonary embolism are the marked suddenness of onset, and distress due rather to dyspnœa than to actual pain, together with a demonstrable thrombo-phlebitis. It must be remembered that frequently pulmonary embolism occurs and no signs of a thrombo-phlebitis are evident until possibly a week or two later. Frequency of occurrence is much in favour of pulmonary embolism. A friction over an infarct might take on the character of a cardio-respiratory friction, and thus simulate cardiac infarction. Coronary thrombosis would have to be corroborated by some change in the heart or circulation apart from the electrocardiogram, because pulmonary infarction can produce changes in the electrocardiogram similar to those due to cardiac infarction.

2. Mediastinal tumours rarely produce pain, except by pressure on the chest wall or by involving the pleura or pericardium. The diagnosis of mediastinal tumour has to be made usually from aneurysm, and occasionally from a bronchogenic tumour extending into the mediastinum. Visible pulsation under a fluoroscope is not diagnostic, because tumours may pulsate and an aneurysm may not. Points in favour of aneurysm are a definite relation of the mass to some part of the aorta on x-ray examination, an expansile pulsation on palpation, a positive Wassermann test, and some cardiac involvement such as aortic insufficiency. Points in favour of tumour are irregularities in the shape of the mass, or multiple masses, or a mass isolated from the aorta, as might be determined by rotating the patient behind the fluoroscope. Absence of lues, nothing else wrong with the cardiovascular system, the presence of secondaries in the neck, and a history suggestive of malignancy are additional points.

3. Œsophageal obstruction or cardiospasm produce distress related to swallowing, and can be diagnosed by having the patient swallow barium under the fluoroscope, as well as by œsophagoscopic examination.

4. Gall bladder and gastric disturbances such as heartburn sometimes produce substernal or precordial distress. Heartburn presents no diagnostic difficulty, on account of its relation to meals and sour eructations. In cholecystitis, if pain be felt in the left breast or below the left breast, it lasts too long to be due to angina, is not related to exertion and may be related to meals. Sometimes pressure over the gall bladder area, on deep inspiration, produces pain referred to the region of the left breast or below it. A gall bladder type of indigestion and an x-ray of the gall bladder with dye will help to settle the question of cholecystitis with or without gall stones. In such cases, however, the heart must be investigated carefully in all respects.

5. A dissecting aneurysm may simulate coronary thrombosis exactly, even to producing the characteristic electrocardiographic changes, by obstructing the mouth of one of the coronary arteries. The pain of dissecting aneurysm however, may go over the abdomen or even down the legs. The blood pressure should be taken in all the limbs. Enlargement of the abdominal aorta may be demonstrated on palpation; a murmur may be heard over the abdominal aorta or femorals, due to the hæmorrhage into the wall of the artery bulging into the lumen of the vessel. An x-ray plate of the chest may show a scalloped outline to a widened thoracic aorta.

6. Cardiac pains. (*a*) Any cardiac disease, such as subacute bacterial endocarditis or rheumatic heart disease, especially when it is active, may have associated pain which is usually persistent and not very severe. This may or may not be changed by exercise. (*b*) Pericarditis produces direct pain, that is, not referred. The sensory nerves situated outside the parietal pericardium are directly stimulated. (*c*) Specific aortitis produces two types of pain. The commoner type is angina; that is, it comes on effort, lasts for a few minutes, and goes away with rest. Occasionally these patients get pains, especially at night, lasting a few minutes or a few hours, occurring chiefly in the top part of the chest. (*d*) Aneurysms also have two varieties of pain. The process of rupturing may produce pain; the other is due to pressure in the chest wall. (*e*) Some cases of paroxysmal tachycardia have pain during the attacks. (*f*) The so-called disordered action of the heart or neuro-circulatory asthenia cases are described as having an ache in the left chest. It is doubtful whether or not this is a real cardiac pain. In most of the cases seen recently it could be demonstrated that the pain of which these patients complained was not of cardiac origin, but was the basis of their cardiac neurosis. (*g*) Angina pectoris. (*h*) Coronary occlusion.

Angina is a term which is used with two meanings, or possibly three. Some physicians call every form of cardiac pain angina. Others, especially in England, use the term to include what we call angina together with coronary thrombosis, naming the former the angina of effort and the latter the angina of occlusion. The term in America, however, is usually restricted to effort pain, and is used in a diagnostic sense to apply to those cases in which there is any form of distress in the cardiac area mentioned above, and the surmise is that the patient has coronary disease. Otherwise, the case would be diagnosed as angina due to aortic insufficiency or stenosis or pernicious anæmia, etc.

Most people have the idea that angina is a severe, sudden pain. Both these descriptions are more or less untrue. It may be a slight discomfort, fullness, a sense of constriction or pressure, or any form of distress up to a severe pain. One characteristic which it almost never has is sharpness. It is never a shoot or a stab, and does not throb. It is always continuous;

that is, it lasts for a definite length of time, longer than a few seconds. It develops gradually, increases to a crisis, and dies away gradually. In most cases it is located in the middle line, and the farther to one side or other of the middle line that it occurs, the less likely is the pain to be cardiac. It is never localized to either axillary region. It may radiate to or beyond the axillary region from the middle line, but never occurs as an isolated pain on either side of the chest outside the anterior axillary line. It may radiate to one or both arms, to the shoulders, or the back, or the neck, or occasionally to the face, or it may commence in the back or almost any place in either arm, or it may be confined to a part of either or both arms, and never reach the chest. Its radiation to the left arm or to both arms has no serious significance; that is, a pain which radiates to the arms is no more serious than one that does not. Radiation to the arm is only important in differential diagnosis, as it pretty well excludes disease below the diaphragm. Further, radiation to the arm does not, as is sometimes thought, prove that a chest pain is of cardiac origin. Spondylitic pains just as frequently go down the arms. Some anginas may last as short a time as one minute, or as long as half an hour or even longer. Ordinarily, the discomfort lasts as long as the exertion continues, and dies down with a few minutes' rest. Therefore, when an angina is brought on by anxiety or apprehension it may be prolonged by panic even up to two hours, just as it may be prolonged by exertion. Half an hour is an average, arbitrary limit for the duration of angina. The attacks come on much more easily with walking after a meal, or the first thing in the morning, or in cold or windy weather. There is usually no dyspnœa with the attacks. After severe attacks the patient perspires, is weak and fatigued. One of the most common accompanying symptoms is the eructation of gas, which is no doubt a vagal reflex. The sense of impending death is related to the severity of the pain, plus the apprehension of the patient, and is of little diagnostic value, as it is much more frequent in hysterical attacks. It is naturally much more common in coronary thrombosis than in angina. Cutaneous or subcutaneous hyperæsthesia may accompany or follow the pain, as it occasionally does any pain, even a headache. It has no diagnostic or prognostic value, for it is just as often present with unimportant non-cardiac pains. It is more common in coronary thrombosis than in angina. The most important point about angina is the ease with which it is brought on. In the mild case, the distress occurs only hurrying up a hill, or walking fast soon after a meal. Finally, it may come walking a few yards, on slight excitement, or after a meal without exertion, or on stepping out into the cold or wind, or in bed possibly from a dream, or from no discernible cause. A patient may deceive one by stating that walking brings on the discomfort, when the pain actually occurs some hours after the exertion, possibly in bed that night. One should therefore make sure that the discomfort comes during the exertion and not some time after. Anginas are occasionally overlooked when the distress is in an uncommon area, such as the forearms, wrists or epigastrium. Another fairly common source of error occurs when a patient states that he gets epigastric or substernal distress after meals, when really the distress is produced by walking after a meal. There should be a more or less constant relation between the degree of exertion and the production of an anginal pain; that is, the pain should occur every time a certain degree of exertion is undertaken. Angina is not an occasional occurrence, but rather an inevitable one with a certain degree of exertion. If the pain be occasional it is probably not anginal, because a patient with spondylitis may get an occasional pain while walking, but will get the same pain more often while sitting or lying, and will usually be able to walk without getting it.

The pain of spondylitis is usually unilateral, very seldom in the middle line, and is characterized by its variability. It is sometimes sharp, sometimes dull, or a burning, or an ache or a tired feeling, having different characters in the same individual at different periods. It lasts any length of time, from a second to several days, or even months continuously. It occurs in different places in the chest from time to time, as well as in other parts of the body. It is these variations in character, duration and situation that distinguish it from angina. The patient with angina has the distress in the same situation, of the same character and duration. Anginas do occasionally reverse their radiation. In the same patient the pain usually starts sub-

sternally and goes down the arm; sometimes it may start in the arm and go to the chest. Spondylitic pains are frequently worse in bed, and are related to position in bed or other special postures, and are induced often by some special movement rather than by some special degree of exertion. They may be localized to a very small area, or they may involve one-half of the chest. They spread to different parts of the chest in a most unaccountable fashion. They may follow the direction of the interspaces, or go directly across the interspaces and have no apparent relation to the nerve segments. Another characteristic of spondylitic pains is that they are periodic. They may be absent for months or even years at a time.

To describe the distress of coronary thrombosis or cardiac infarction is a much more difficult problem. In general, one may say that the severity of the distress depends on the size of the vessel which is occluded or narrowed and the suddenness with which the obstruction is brought about. The whole of one coronary artery may be completely occluded slowly and gradually by fibrosis around its mouth, from syphilitic aortitis, without any pain or symptoms. There may be some other unknown factor, however, because sometimes patients with serious or fatal attacks have no pain. It has been found in more than one hospital that in 35 per cent of the fatal cases in which a fresh infarct was found at autopsy, the patients had gone through their last illness without pain. The pain therefore may vary from nothing at all to the most severe degree imaginable—one in which even morphine, given at the rate of one grain per hour, has scarcely any effect in producing relief. In general, compared to angina, the pain of coronary occlusion is of longer duration, greater severity, more widespread, and perhaps more often lower in the chest or epigastrium. Its duration is usually hours or days, instead of minutes, although mild cases may have pains lasting only a few minutes throughout the attack. Some cases (10 or 15 per cent) commence with anginal pain for a few days, or even two or three weeks, and then culminate in a severe prolonged pain. In a few cases the pains are anginal throughout, occurring only on effort. It would appear reasonable to believe that temporary anginas are really cases of cardiac infarction. How else can one explain the case in which angina, usually coming on rather suddenly, lasts a few days or weeks and then disappears completely? The cases with terrible pain are usually serious. One must not, however, conclude that the reverse is true, because quite a few patients with very mild pain die suddenly. In an ordinary case the pain of coronary occlusion lasts for hours or two or three days, and may keep recurring for two or three weeks. In some cases, it continues to recur for months, with occasional bouts of slight fever. These cases should be regarded as progressive or recurrent in nature, and at autopsy evidences of fresh extensions are found around the edge of the original infarct. The pain is of sudden onset in only 25 or 30 per cent of cases, and is usually unrelated to exertion. There are a few cases, however, which come on immediately after, or within twenty-four hours of violent exertion. These are very difficult to understand, unless Leary's explanation of rupture of a sub-intimal atheromatous area into the lumen of the coronary applies. It is important to recognize that coronary occlusion can and does, although rarely, result from violent exertion, because this point brings it within the scope of the Workmen's Compensation Act.

The diagnosis of angina is made on the history alone, and very frequently coronary thrombosis can be diagnosed on the history alone; what one finds on physical, x-ray or electrocardiographic investigation is merely confirmatory, and in 25 or 30 per cent of cases of angina everything in connection with the cardiac investigation is normal, excepting what one finds by inquiry. One of the chief objects of this paper is, if possible, to improve our methods of inquiry. It is of the utmost importance to get all the facts in connection with the pain from the patient himself and not from a second person. For this, patience, tact and dexterity are necessary, because people resent being closely cross-questioned after they have finished telling you what they think about themselves, or what someone else has told them. Some patients are much more interested in telling what they think produces their distress than they are in describing the actual distress. If you take second-hand information about the position, duration and character of the distress, you will often be led astray. One should therefore go about inquiry in these patients in a

systematic way, asking questions based on four different points in connection with the pain; first, the location, second the character, third the duration, and fourth, the factors influencing the pain.

Obviously the first question is, Where exactly is the pain situated and how low down does it go? Is the pain always in the same place or does it shift? If it occurs in two or more places in the chest, the chances are it is not cardiac. When a patient has multiple pains in the chest, each pain has to be taken individually and analyzed, because one of them might be anginal and the others not. Where else in the body does pain occur? If pains be present in various places, such as the back, neck, legs, arms, etc., the probability is that all the pains are of one common origin, which cannot be cardiac, because they shift from place to place and some of them occur outside the cardiac area for pain.

Questions about the character of the pain are not very important. Anginal pains are obviously of the same character in the same individual. They vary in severity but not in character. If however in one individual the pains do vary in character, being sometimes sharp and sometimes a dull ache, or sometimes a burning sensation, this variability practically proves they are not cardiac.

Questions in connection with duration are extremely important. The first is, How long does the pain last at one time continuously? Pains lasting only a second or so are probably not cardiac. They are too short for angina. If sometimes the pain lasts a few seconds or a few minutes, and sometimes a few hours, they are probably not cardiac. The next question is, When did the pain commence? If it began only a short time previously, such as a few days or a week or two, and lasts any length of time, short or long, it could be coronary occlusion. If, however, it began months or years before, and lasts hours or days continuously, it obviously could not be due to cardiac infarction, because it has occurred too often and lasted too long. If the pain began years before, and the patient has had intermissions of weeks or months, it could not be anginal because angina occurs continuously, although it may be better in the summer and worse in the winter. The first time an unaccountable pain occurs in the chest, especially in the middle line, or in an adult, no matter what its duration, but more especially if it lasts over an hour, the patient should be put to bed and kept there until cardiac infarction is excluded.

The fourth group of questions refers to factors influencing the pain. A good opening question is, Does the pain occur more frequently in bed or when up? The root pains of spondylitis are often or usually worse in bed and are improved by exercise. Is the pain related to position in bed? or rolling over in bed? Spondylitic pains are frequently induced by lying on one side or the other, and relieved by changing one's position, or they may be induced by a certain position in a chair or automobile. Does bending, reaching, or any special movement induce the pain? Can the patient do anything to induce the pain at will? Does walking bring on the pain? or walking fast? If walking induces it, does it do so regularly or occasionally? It is surprising how seldom walking induces spondylitic pain. Does the pain come on during exertion or afterward? Movements involving jarring often bring on spondylitic pains.

Some such detailed method of inquiry as that outlined above may be necessary to prove that a pain or pains are not of cardiac origin. The details are not at all necessary however in most real anginas, because the patients in the latter case will probably volunteer the information that they cannot walk far because they are stopped by some discomfort in their chests, or somewhere in the cardiac area for pain. The diagnosis of angina, therefore, is fairly easy and fairly certain, except in people who have a language difficulty or who give contradictory answers.

The diagnosis of coronary thrombosis is relatively easy in about 60 or 65 per cent of cases; in the remainder it is extremely difficult, and in many it is impossible. Think, for a moment, how many cases of coronary occlusion or cardiac infarction you diagnose in a year, in the absence of pain. When one does diagnose coronary thrombosis in the absence of pain, one feels that something quite creditable has been done. When however one approaches the question from the autopsy end widely different feelings are induced. If 35 or 37 per cent of fatal cases of cardiac infarction have no pain, what about the less serious ones who live?

Graded according to severity, there are four types of coronary thrombosis. The most severe group is made up of those dramatic cases where the sufferers drop dead or collapse, gasp for breath, become unconscious and die in a few minutes, or live for a few hours, with terrible agony or terrible dyspnœa. This group is comparatively small in number. The second is made up of those cases of average severity that are commonly diagnosed. These patients have persistent pain, usually across the chest, lasting a few hours or a few days, of gradual or sudden onset, with or without vomiting, shock, pallor, cyanosis, sweating, etc. Such cases are diagnosed easily and with a fair degree of certainty. This group is many times as numerous as the first, and carries a mortality of 30 or 40 per cent.

There is a still larger group of mild cases, frequently undiagnosed because they have atypical, slight, or mild pain, or no pain at all. In this group, the mild pain may be relieved by nitroglycerin, or whiskey, or heat. Some may have only an unaccountable attack of weakness, or dizziness, or shortness of breath, or fainting, and afterwards feel quite well. This group carries a much lower mortality, possibly 5 or 10 per cent. Whenever any sudden change occurs in the condition or function of the heart, cardiac infarction should be suspected. The following are some of the changes that might occur—a sudden lessening of the exercise tolerance; a sudden appearance of circulatory failure; an unaccountable increase in the degree of circulatory failure; the initial attack of a new rhythm, especially in a person of sclerotic age; the onset of any form of block or pulsus alternans; the initial attack of nocturnal dyspnœa, cardiac asthma, acute œdema of the lungs or angina; a marked increase in the frequency of attacks or angina or in the ease with which they are induced, or when they commence to come with rest in bed. In this third mild group, fever and leukocytosis may be absent, and there will likely be no change in the heart or circulation on physical examination. The best evidence in such cases are characteristic changes in the shape and direction of the T waves in a series of electrocardiograms, taken over a period of two or three weeks.

The fourth group is made up of cases without symptoms. That such a group exists we know from autopsy findings. One or more healed infarcts are frequently found post-mortem, of which there had been no signs or symptoms during life. Some of this group have their coronary thrombosis masked by some other serious disease, such as congestive failure. Others must have had their attacks and not known that anything had happened.

The diagnosis of coronary thrombosis is made on some of the following points.

First, the previous history. Seventy per cent of our series had a previous history of angina or dyspnœa on exertion.

Second, the nature of the attack is often alone sufficient for the diagnosis. If a patient, two months previously, began to have substernal distress in walking so far at a certain gait, and then one night, while at rest in bed, gets a similar sort of pain, but more severe, and lasting two or three hours or more, then the diagnosis of cardiac infarction is certain, without any confirmatory evidence. There are very few diseases that can produce a constricting pain all over the front of the chest and down both arms.

Third, a leukocytosis is present almost as soon as the pain occurs.

Fourth, a slight to moderate fever comes on, usually the second or third day, and lasts for a few days or a week or two.

Fifth, more serious cases show some change in the heart or circulation, such as a weak pulse, a rapid pulse, pulsus alternans, a new rhythm (such as auricular fibrillation, flutter, or ventricular tachycardia), pallor, cyanosis, sweating, shock, collapse, dyspnœa, weakness, faintness unconsciousness, delirium, gallop rhythm, œdema of the lungs or legs, enlargement of the liver, a fall in blood pressure, or a friction rub.

Sixth, embolism occurs in a considerable percentage of cases, commonly estimated at about 15. This frequently occludes the whole aorta at or near the bifurcation, because the mass of agglutinated platelets within the ventricle on the infarcted area is large.

Seventh, in doubtful cases, the electrocardiographic changes in the shape and direction of the T wave are most helpful, and often constitute the only confirmatory evidence. It must be realized, of course, that one electrocardiogram taken before or during an attack of coronary occlusion is of little value. Its diag-

nostic value is almost nil, because one does not know what it had been like previously. To be of diagnostic value, a series must be taken over a period of from two days to three or four weeks, because the characteristic changes may occur rapidly or slowly, and are some times delayed as long as three or even four weeks. As a general statement, one would be fairly safe in saying in a patient suspected of having coronary occlusion that if the T's remained fixed for three weeks, coronary occlusion could be excluded. In following this rule, one would certainly miss odd cases, but the chances are that most of them would be mild and unimportant. Further, it is necessary to remember that what changes might occur could be caused by other diseases, which therefore have to be excluded. Changes in the take-off, shape, and direction of the T waves due to cardiac infarction may be somewhat closely simulated in any form of active heart disease, including pericarditis; in myxœdema at the commencement of thyroid administration; in an anginal attack, where they last only a few minutes; in digitalis administration; and in any severe illness such as pneumonia, diabetic acidosis, or pulmonary embolism. They have been noted in delirium tremens. They can be produced temporarily in normal people by breathing an atmosphere low in oxygen. The writer has to confess that he has never been able to use the so-called significant Q or S waves for the diagnosis of cardiac infarction. Where they have been seen the diagnosis has already been established by more outstanding changes in the T waves.

When a pain occurs in and is confined to the epigastrium the chance of its being cardiac is greatly increased. In such a case the patient should be put to bed and examined for both coronary and abdominal disease, and the decision arrived at by the preponderance of evidence in favour of one or the other. In case, however, no decision can be reached, or where the case is in an isolated place and facilities for further investigation are wanting, the patient should be confined to bed for four or five weeks, on suspicion of its cardiac origin, especially when there is a very fair probability that it might be cardiac. The mistakes that are made nowadays are the reverse of those made ten or fifteen years ago. Then coronary thrombosis was not diagnosed when it should have been. Now it is diagnosed frequently when it should not be, in cases that obviously have pain due to gall bladder or other abdominal origin. It is a very common tendency when the profession has recently learned a new diagnosis to overwork it.

MYASTHENIA GRAVIS: A CLINICAL REVIEW OF EIGHTY-SEVEN CASES OBSERVED BETWEEN 1915 AND THE EARLY PART OF 1932*

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IN the spring of 1932 Dr. Walter Boothby[1] began his extensive investigation of myasthenia gravis at The Mayo Clinic. Recently, in his eighth report,[2] he published his observations on a series of 82 cases in which the patients had been under his supervision since 1932. As there is no available report regarding the results of treatment in a single large series of cases observed prior to the work of Boothby, it was deemed advisable to review the clinical records of patients examined at the clinic before the use of ephedrine, glycine, and prostigmin. With this plan in mind, the present study was undertaken, in the hope that we might be able to judge of the advance which has been made regarding this disease since 1932.

No attempt has been made in this study to review the literature on myasthenia gravis. Acknowledgment must be made to Miss Harriet Edgeworth[3] who introduced the use of ephedrine in the treatment of this malady. At The Clinic Dr. Henry Woltman was the first to appreciate

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This review includes only those cases of myasthenia gravis which were observed between 1915 and the early part of 1932. They are not to be confused with the cases which have been observed by Boothby since 1932.

the possibilities of ephedrine in the treatment of myasthenia gravis, and he introduced its use in the neurological service. It is a noteworthy fact that for a condition as prevalent and as strikingly characteristic as myasthenia gravis no instances of the disease appear to have been recognized or at least reported in the literature prior to the cases observed by Willis[6] in the seventeenth century, by Wilks,[5] in 1877, and by Erb,[4] in 1879.

The present study includes 108 cases observed between 1915 and 1932. Eighty-seven of these are undoubtedly cases of myasthenia gravis and form the basis of our statistical study. In the remaining 21 the diagnosis was myasthenia gravis. Eleven of the patients in the 21 cases have received ephedrine, glycine, or both, since 1932, and are therefore included in the series of 82 cases recently reported by Boothby. In the remaining 10 there were some unusual features in addition to the myasthenia gravis, so that, with the data available, some doubt might be cast on the accuracy of the diagnosis. These 10 cases are included in the addenda, as they illustrate the more common difficulties encountered in the diagnosis of myasthenia gravis.

ETIOLOGY

An analysis of the cases did not reveal any cause for myasthenia. The records show that in 51 there was no discoverable cause that might be considered as a possible factor in the causation of the disease. In 27 it appeared that some infection, such as a "cold", "flu", tonsillitis, and pneumonia played a precipitating rôle, although the relationship of apparent cause and effect was not always clear. The fact that infection appeared to play a possible rôle in the initiation of symptoms in 31 per cent of the 87 cases is worthy of note, although its exact significance is not clear. It has also been observed that recurring episodes of myasthenia gravis are frequently preceded by some acute infectious process. In 4 cases the first symptoms of muscle fatigue closely followed normal pregnancy. Of the 42 female patients, 25 were married. Seven patients had twelve pregnancies in the course of the disease. In 5 of the pregnancies the symptoms of myasthenia gravis were aggravated; in 4 of the 5 pregnancies the symptoms improved with the termination of the pregnancy or the weaning of the child. During 7 of the 12 pregnancies no changes in the symptoms of myasthenia were noted. At least 4 of the 25 married women were known to have had several uneventful pregnancies prior to the onset of any symptoms of myasthenia. In 5 of the 87 cases isolated precipitating causes were noted, but these were so variable as to be of no seeming importance. Unusual precipitating causes have been recorded in the literature; the occurrence of myasthenic symptoms has been noted following electric shock. The significance of these factors is not known. There was a history of previous syphilitic infection in only one case in the series.

Age, sex, race and heredity.—The ages of the patients at the time of the first onset of the symptoms varied from 10 to 77 years. Of the 87 patients, 7 were in the second, 27 were in the third, 18 were in the fourth, 13 were in the fifth, 12 were in the sixth, 8 were in the seventh, and 2 were in the eighth decade of life respectively. The greatest number were in the third and fourth decades of life. It is usually stated that females are more frequently affected than are males, but in this series, 45 patients were males and 42 were females. It therefore would appear that sex does not play any specific rôle in this disease. So far as we could determine the factor of race had no apparent significance. In no instance in this series of cases was there any evidence of either familial or hereditary factors.

Occupation and geographic distribution.—The occupations of the 87 patients were as follows: 25 were housewives, 17 were farmers, 12 did other manual labour, 12 were executives or did office work, 5 were teachers, 3 were attorneys, 2 were physicians, and 11 followed miscellaneous occupations. There was no close correlation between the occupation of the patient and the situation of the early muscular weakness. Just as frequently as not the ocular signs were likely to be the first symptoms among farmers, while in cases in which the patients followed a more sedentary occupation, weakness of the legs or arms was likely to develop before or in conjunction with ocular disturbances. The distribution of the patients according to residence was in keeping with the general distribution of patients as seen at the clinic. In other words, there was no special environmental or geographic characteristic.

LAPSE OF TIME BETWEEN THE APPEARANCE OF FIRST SYMPTOMS AND THE MAKING OF A CORRECT DIAGNOSIS

The length of time which elapsed between the onset of the first symptoms and the making of the correct diagnosis ranged from one month to 25 years, and varied considerably. For the 87 cases this period averaged four and eight-tenths years. In the majority of cases the diagnosis was made between two and four years after the onset of the disease. Fifteen patients had had the affliction in a mild form for ten years or more before it was correctly diagnosed. The fact that the disease may be present for so many years before the diagnosis is made suggests at once that at least in a fair percentage of the cases the disease process must be relatively mild to escape diagnosis for such a long period of time. It is this remarkable tendency of the disease to have such a variable course as regards severity and duration that makes any deduction regarding the value of treatment a difficult and delicate one. It may well be a surprise to some readers that myasthenia gravis may exist for so many years without more serious consequences, and that it may be present in such a relatively mild form as to go unrecognized for as long as twenty-five years.

RELATIONSHIP OF SYMPTOMS TO OBJECTIVE FINDINGS; EARLY SIGNS

In this series of cases the appearance of the first symptom of myasthenia gravis and the appearance of the first objective sign of the disease paralleled one another rather closely. At times, however, the patient complained of general weakness, or even of weakness referable to a specific group of muscles for some months or even years before any objective evidence of the disease appeared. When the weakness did appear it often did not correspond to the group of muscles to which the subjective symptoms were referred. The relationship of the initial symptoms and the first objective signs of the disease is shown in Table I. In 26 cases the first signs appeared during the first month of the disease. In 29 cases the signs appeared between the first month and the first year; in 16, between the first and second years, in 16, after the second year. Three patients in the last group had noted subjective complaints for 12, 13 and 23 years, respectively, prior to the appearance of objective signs. As we have said previously, it is this tendency for the late development of positive signs which frequently leads to errors in diagnosis. Because of the lack of objective evidence of the disease these patients are frequently considered as "neurotics". It must be confessed that 12 years is a long time to wait for objective evidence of a disease process, but this was necessary in three cases in this series.

TABLE I.
INITIAL SYMPTOMS AND SIGNS IN EIGHTY-SEVEN CASES OF MYASTHENIA GRAVIS

Initial symptoms	
Symptoms referable to ocular disturbances	36
Symptoms referable to weakness of the limbs	24
General weakness	11
Bulbar weakness	9
Facial weakness or weakness of the jaws	5
Miscellaneous symptoms	2
Total	87
First objective signs	
Ocular weakness	58
Pharyngeal or bulbar signs	13
Weakness of the limbs	11
Weakness of the jaw	5
Total	87

In slightly more than a third of the cases the first symptom was referable to the ocular muscles, while in two-thirds of the cases the first objective signs were related to these muscles. Weakness of the masseter muscles, which is said to be very characteristic of myasthenia gravis, was an early sign in only 14 per cent of the cases.

MUSCLES MOST COMMONLY AFFECTED; OPHTHALMOPLEGIC TYPE OF MYASTHENIA GRAVIS

The groups of muscles involved in this series of cases and the percentage of cases in which they were involved are as follows: ocular muscles 78 per cent, facial muscles and masseter muscles 61 per cent, muscles of deglutition and phonation 58 per cent, muscles of the arms 29 per cent, muscles of the legs 24 per cent, and muscles of the neck and shoulders 17 per cent. The groups of muscles involved were determined during the various visits which the patients made to the clinic. It has been noted that in a given case, if there are periods of improvement and recurrence of weakness, the muscular weakness has a tendency to maintain a fairly constant pattern and the recurring episodes affect the

same muscles, although the severity of the weakness may vary considerably in successive spells of weakness. No ocular findings of any type were noted in 7 cases. In 8 cases the reverse was true, that is, the only objective evidence of myasthenia gravis was the presence of ocular phenomena. It has been observed that in several cases in which ocular disturbances were the only objective signs of myasthenia gravis involvement of other muscles has not been noted. In such cases in which the disease is of the external ophthalmoplegic type it may be mistaken for various other conditions in which ophthalmoplegia is an outstanding symptom.

Reflex Disturbances

No unusual reflex disturbances were observed in any of the cases. The deep tendon reflexes were occasionally decreased or even increased, but never absent. In a few cases the abdominal reflexes could not be obtained.

Changes in the Cerebrospinal Fluid

In the 32 cases in which the spinal fluid was examined, the study included the Kolmer and Kahn tests, the Nonne-Apelt reaction, a cell count, an estimation of the amount for the total protein, a colloidal gold test, and estimations of the pressure. In 28 of the cases the spinal fluid was entirely normal. In 3 there was a slight increase in the number of cells, that is, there were 6, 8, and 11 cells per cubic millimetre of spinal fluid, respectively. In one case the value of the total protein was 100 mg. per 100 c.c. of spinal fluid. It therefore is evident that the spinal fluid is invariably normal in cases of myasthenia gravis.

Electric Reactions

Much has been written regarding the value of the electric reactions in cases of myasthenia gravis. Unfortunately, electric examination was not carried out regularly in these cases, and our figures, therefore, are not conclusive. The failure to test the electric reactions in these cases seems to have been attributable to the assumption that the electric reactions were not necessary to make a diagnosis in a case in which the clinical findings were typical, and that they would not aid in making the diagnosis in a case in which the diagnosis was doubtful. The electric reactions were tested in 24 cases. In 11 cases the typical reaction of myasthenic muscle fatigue was present; in 4 cases the reactions were recorded as doubtful, and in 9 cases there was no myasthenic reaction. In several of the cases in which no myasthenic reaction to the faradic current could be obtained only the ocular and facial muscles showed evidence of the disease process. It may be that the application of the electric tests to the muscles of the limbs in these cases was not a fair procedure, and that the tests should have been applied to the affected muscles.

Routine Medical Examination and Laboratory Tests

The usual routine examinations, including medical tests and laboratory investigations, were carried out in these cases. From these studies very little helpful information was derived, unless it was the fact that such examinations as a rule failed to reveal any abnormality. The average range in the value for the systolic blood pressure was between 105 and 130 mm. of mercury. In a few instances the value for the systolic pressure was as high as 180 mm., but this occurred only among elderly patients. Examination of the blood, including the flocculation test for syphilis, estimation of the concentration of hæmoglobin, and erythrocyte and leukocyte counts, did not disclose anything of significance. Routine roentgenological examination of the thorax did not reveal any abnormality. In no instance was the shadow of a tumour of the thymus gland observed. In several cases a substernal thyroid shadow was noted. The basal metabolic rates varied from −20 to +20. Analysis of the gastric contents revealed that the value for total acidity was 80 and for free hydrochloric acid was 30 (Töpfer). Routine examinations did not reveal any evidence that would aid one in determining the cause or nature of this disease process. There is a suggestion in the history of these patients that infections may play a possible rôle in the etiology, but the clinical examination did not furnish any corroborative evidence.

Biopsy.—Biopsy was performed in 5 cases. In 4 the microscopic examination of a section of the affected muscle did not reveal anything of importance; in the remaining case the biopsy disclosed an accumulation of lymphocytes or so-called lymphorrhages. It was suggested that

these might be nuclei of degenerated muscle. The presence of an increased number of lymphocytes in the affected muscles has been frequently referred to, but it is not a constant finding and its significance is not known.

PSYCHIC REACTIONS

The psychic reactions are not characteristic in cases of myasthenia gravis. As one might well anticipate, these patients, because of their physical incapacity, have a tendency to emotional disturbances, either of an anxiety or depressive type. These reactions are understandable when one realizes the seriousness of the affliction. The psychic reactions may manifest themselves in varying degrees, but as a rule they may be considered within the range of normal mental reactions. Seven of the patients in this series were sufficiently depressed to warrant some special comment by the physician. One of them committed suicide.

DIAGNOSIS

The diagnosis of well-established myasthenia gravis is relatively easy. In many cases the condition is not typical, and especially during the early months or even years of the disease the diagnosis may present considerable difficulty. The most frequent incorrect diagnosis during the early stages of the disease probably is "psychoneurosis". The diagnoses which had been made before the patients came to the clinic are of interest. In 41 cases no accurate diagnosis had been made, but in some of these the disturbance had been considered functional. A positive diagnosis of myasthenia gravis had been made in 11 cases, and in 9 a tentative diagnosis of myasthenia gravis had been made. Thus, in 20 of the cases the disease had been correctly diagnosed before the patients came to the clinic. In 7 cases the patients had been treated for functional disorders, but, as stated previously, the condition had been considered functional in several other cases in which no accurate diagnosis had been made. In the remaining 19 the diagnoses had been as follows: ocular palsy in 5, progressive muscular dystrophy in 3, bulbar palsy in 3, multiple sclerosis in 2, goitre in 2, and tumour of the brain, facial diplegia, apoplexy, and arteriosclerosis of the central nervous system in one case each. This list of diagnoses illustrates the usual difficulties encountered in the differential diagnosis of myasthenia gravis.

In 7 of the cases the "admission diagnosis" was as follows: psychoneurosis in 2, bulbar palsy in 2, progressive muscular dystrophy in 1, ophthalmoplegia resulting from a focal lesion in 1 case, and arteriosclerosis of the central nervous system in 1. In two other cases a diagnosis was not made when the patient was first admitted.

It is well to bear in mind that an early diagnosis of myasthenia gravis may be very difficult to make, as the symptoms may be essentially of a subjective character and the examination may reveal little that is objective. It is also important to remember that in a small group of cases the symptoms are very mild and chronic and that they may be present for years before their significance is appreciated. It is certainly true that not infrequently myasthenia gravis may present itself under the guise of marked general fatigue, and to the chagrin of the physician his diagnosis of neurasthenia, chronic nervous exhaustion, and so forth, returns to haunt him in the form of an organic disease. Conversely, it must be emphasized that every chronic fatigue state is not a form of myasthenia gravis, and although the patient may improve as a result of what may be considered proper treatment for myasthenia gravis the diagnosis of the disease is not established on therapeutic grounds.

REMISSIONS

It is a common statement that one of the characteristic features of myasthenia gravis is the occurrence of a partial or complete remission of the myasthenic symptoms, which may vary in duration from months to years. In this paper the term "complete remission" has been applied to seemingly complete recovery which has lasted for more than a month and has permitted the patients to resume their former occupations. The term "partial remission" has been used to indicate some improvement which has lasted for months or years. Moderate fluctuations of symptoms have not been classified as partial remissions. These fluctuations have been considered normal variations of the disease process. The figures regarding remissions are based to a great extent on the information obtained from the patients after they were dismissed from the clinic. The figures, therefore, are not entirely accurate, but they should serve as a basis of comparison for future work.

In 44 of the cases no mention was made of a remission, and in 3 other cases the patients failed to reply to the questionnaires. Twenty-seven patients had 43 complete remissions, which ranged from more than one month to 15 years in duration. The average duration of a complete remission was two and two-tenths years; the majority of them lasted less than one year. It is of special interest that in 3 of these cases the remissions lasted 4, 7, and 15 years respectively. These figures appear to be rather high and it may be that some of these complete remissions should be classified as partial remissions. Thirteen patients had 17 partial remissions which lasted from less than one month to 16 years, the average duration being one and five-tenths years. The majority of these remissions lasted less than six months. Needless to say, it is this tendency to remissions in this disease that makes the benefits of any form of treatment so difficult to evaluate. The remissions which have been noted in this series of cases might be termed "spontaneous" remissions.

COMPLICATIONS

No unusual complications were noted in this series of cases of myasthenia gravis. It was observed, however, that any accompanying illness exaggerated the existing symptoms and also tended to precipitate added myasthenic symptoms.

THE RESULTS OF TREATMENT

It was possible to trace all but three of the patients in this series of cases. Of the 84 patients who could be traced, 34 are known to have died; 18 of these were females and 16 were males. The ages of these patients at the time of their death ranged from 13 to 72 years. At the time of their death, 1 of the patients was in the second decade, 7 were in the third decade, 10 in the fourth, 7 in the fifth, 4 in the sixth, 4 in the seventh, and one was in the eighth decade of life, respectively. The majority of deaths occurred in the decades of life in which the disease is most frequently encountered. The duration of the illness up to the time of death varied from six months to twenty-two years; the average duration was four years and six months. The cause of death in the 34 cases was recorded as follows: the disease itself in 24 cases; cause unknown in 3 cases; cardiac failure, suicide, respiratory failure, undulant fever, nephritis, bulbar palsy, and strangulation in 1 case each. Of the remaining 50 patients who could be traced 12 reported that they were alive, but they did not furnish sufficient information to permit us to appraise the exact status of their physical condition. Thirteen reported that their physical condition was the same as it had been at the time of their last visit to the clinic, and 10 reported that they were improved or had had a remission of symptoms. Eight patients reported that their condition was worse than it had been, and 7 reported that the course of the disease had fluctuated since they had last visited the clinic.

The 34 deaths in this series of cases, which was observed between 1915 and the early part of 1932, and the present physical condition of the remaining 43 patients should be contrasted with the results obtained by Boothby since the early part of 1932. In his eighth report on myasthenia gravis, Boothby reported the following results: of the 82 patients who had myasthenia gravis and who had been under his observation four years since the early part of 1932, 41, or 50 per cent, were employed at full-time or part-time work, 15 were able to be up and about their homes, 2 were confined to their rooms, 7 had been lost track of, and 17 had died. Of the 17 who died 5 should be excluded from consideration of the effect of treatment because 1 died immediately after he came to the clinic before therapy could be started, and 4 abandoned treatment or died of other causes not directly attributable to the myasthenic syndrome.

FINDINGS AT NECROPSY

Necropsy was performed in 3 cases. The reason for so few post-mortem examinations is because the great majority of the patients died at home and no necropsy was performed. The post-mortem findings in the 3 cases were uniformly negative. In one case it was noted that the muscles contained more fat than usual and that occasional lymphocytes were present in the muscle bundles. In one of these cases the myasthenia gravis was of a severe type; the entire duration of the disease was only nine weeks. Hyperplasia of the thymus gland is not an unusual finding and post-mortem examination has revealed the presence of a "thymic

tumour'' in a small group of cases, but in the 3 cases in this series in which necropsy was performed no disturbance in the ductless glands was noted.

TREATMENT

The treatment of myasthenia gravis until very recently has been a source of discouragement to the patient and a cause of nightmare for the physician. The physician has felt helpless, but in his desire to aid the patient he has resorted to the use of various drugs and remedies, all of which have seemed powerless to stem the course of the illness. Strychnine and thyroid extract probably are the drugs most frequently used. Diets, baths, electricity, and massage have had their advocates. Operations on the thyroid gland have been recommended, as has the application of roentgen therapy to the region of the thyroid and thymus glands. Recently, serums and vaccines have been employed in an endeavour to combat some hidden infection. All foci of infection have been removed, but the results of treatment have remained the same. The same may be said of organotherapy, as the recent administration of extracts of the suprarenal gland, tissue extracts, and various other products. In 1930, Harriet Edgeworth announced the results in her own case following the administration of ephedrine sulphate. Since then Boothby and others have reported their results with ephedrine and glycine. Benzedrine sulphate, prostigmin, and vaccines recently have added to our therapeutic armamentarium. The results of treatment since 1930 have been so striking and the renewed interest in this disease has been so enthusiastic that it would seem that we might be on the threshold of a definite understanding of this disease and a means of intelligently combating it.

ADDENDA

In addition to the 87 cases of myasthenia gravis which form the basis of this study we have reviewed 21 other cases in which a diagnosis of myasthenia gravis was made. These 21 cases have not been included in the group of cases for analysis, because of various complicating factors. Eleven of the 21 patients were first examined prior to 1932, but as they subsequently received ephedrine, glycine or both, they are included in the series of 82 reported by Boothby. In two cases there was an associated muscular dystrophy. This complication has been observed previously and is not to be confused with the Landouzy-Déjérine type of muscular dystrophia that may simulate myasthenia gravis. In the remaining 8 cases another condition was considered in the diagnosis, and these cases therefore have not been included in the analysis, as the diagnosis of myasthenia gravis was not positive and the information which was obtained after the patients left the clinic was not accurate enough to aid us in making a definite diagnosis. The conditions which were considered in the differential diagnosis in these cases were polioencephalitis, ''acute myasthenia gravis'', external ophthalmoplegia, anorexia nervosa, psychoneurosis, exophthalmic goitre, simple depression, and multiple sclerosis. As has been stated previously, these represent the more common conditions which must be considered in the differential diagnosis of myasthenia gravis.

SUMMARY

An analysis of these cases has not furnished any helpful information regarding the possible etiology of myasthenia gravis. It was observed that some form of infection did appear to act as a precipitating factor in 31 per cent of the cases. The age of the patient at the time of the onset of symptoms varied from 10 years to 77 years; in the majority of cases the patients were affected during the third and fourth decades of life. Myasthenia gravis may represent an acute process which has an early fatal termination, or it may run a long mild course. The average lapse of time between the first appearance of symptoms and the making of a correct diagnosis was four and eight-tenths years. Fifteen patients had symptoms of the disease for ten years before the condition was correctly diagnosed. This tendency for the disease to be insidious in onset and very mild during the first few years frequently results in an early incorrect diagnosis; the condition often is considered functional in its early stages. In cases in which the disease is of the ophthalmoplegic type, it is especially prone to be chronic and relatively mild. The most frequent early sign of the disease is a disturbance in the ocular muscles. Weakness of the masseter muscles was present as an early sign in only 14 per cent of the cases. Twenty-seven patients had remissions; the average duration of the remissions

was two and two-tenths years. In three instances the remission lasted for 5, 7, and 15 years respectively. In 20 of our 87 cases a correct diagnosis had been made before the patients came to the clinic; in 7 the diagnosis which was made when the patients were first examined at the clinic had to be changed subsequently; and in 2 others no diagnosis was made when the patients were first examined. In the differential diagnosis of myasthenia gravis functional disorders are the most common source of error. The association of muscle dystrophy with myasthenia gravis has been observed; this should not be confused with primary dystrophy.

Thirty-four deaths occurred in the 87 cases of myasthenia gravis observed between 1915 and the early part of 1932. In these 34 cases the duration of the disease varied from 6 months to 22 years, the average duration being four and a half years. As neither any therapeutic measure of value nor any practical or consistent regimen for treating patients who had myasthenia was available at the time this series of cases was observed this mortality represents essentially that of the untreated disease. The results here recorded should be compared with the results obtained by Boothby in a subsequent series of 82 cases of myasthenia gravis in which the patients were treated subsequent to 1932 by a systematic regimen embodying the use of the new therapeutic agents now employed in the treatment of myasthenia gravis.

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A PRELIMINARY REPORT ON GLANDULAR THERAPY IN GYNÆCOLOGICAL CONDITIONS*

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THIS paper is a report of work which has been done in the Gynæcological Clinic of the Women's College Hospital in 1936. I have used the word "preliminary" with special intent as there are phases of endocrine therapy which will take a much longer period to demonstrate their value. However, certain results have been obtained which have definite therapeutic value and therefore should be discussed now. As this is entirely a clinical report I have omitted the history of work already done in this field and have only touched briefly on the action of the hormones used.

Let me remind you briefly of the action of the hormones concerned with menstruation. The anterior pituitary hormone, which has two stimulating factors known as prolan A and prolan B. A is the follicle-stimulating factor which acts on the ovary to produce the follicular hormone "œstrin". B is the luteinizing factor which in the same way stimulates the ovary to produce the corpus luteum hormone "progestin". Œstrin acts directly on the endometrium of the uterus, causing the proliferative phase. Progestin carries on the stimulation of the endometrium of the uterus to the pregravid or secretory phase. Ideally, œstrin activity stops and progestin activity begins when the Graafian follicle ruptures. Dr. Kurzroh has a good diagram in the June number of the *American Journal of Obstetrics*, 1935.

In our work we used three preparations (1) *theelin in oil*—2,000 units per c.c. Theelin is a chemically pure crystalline œstrogenic hormone, ketohydroxyestrin, isolated from pregnancy urine—(a unit being the amount of hormone necessary to produce œstrus with cornification, as judged by vaginal smears in an ovariectomized sexually mature rat). (2) *Antuitrin S.*—This is the anterior pituitary-like gonad-stimulating hormone. It is derived from pregnancy urine and is not identical with the gonadotropic principle of the anterior pituitary itself, but is very closely related to it. (3) *Antuitrin gonado-*

*A paper read before the Section of Obstetrics and Gynæcology, Toronto Academy of Medicine.

tropic.—This is the actual gonad-stimulating hormone, and was derived from the anterior pituitary lobes of sheep.

In the use of these hormones as treatment we must differentiate between a substitution therapy, where, for instance, œstrin is replaced in a system in which it is lacking, and a stimulating therapy, designed to produce more œstrin or progestin. In the substitution therapy a quantitative result is obtained which can be predicted to a great degree and which ceases when treatment ceases. In the stimulating type the resulting interactivity of the hormones and their eventual equilibrium is much more difficult to predict and the hoped-for result more difficult to obtain. However, if results are obtained it will usually carry on when treatment ceases for a period of time, if not for always.

Menorrhagia and metrorrhagia due to endocrine unbalance have been very difficult to control in the past, especially at puberty and at the menopause. Because the anterior pituitary-like hormone (antuitrin S) is most comparable to the luteinizing factor (prolan B) it was the one of choice, yet it would seem sensible in cases where the cycle was not properly established *i.e.*, where there was a period of prolonged bleeding followed by a period of amenorrhœa, to use the gonadotropic hormone which contained both A and B and would tend to produce a normal cycle.

In this series 38 patients were treated, 10 with antuitrin gonadotropic and 18 with antuitrin S. The diagnosis of disturbed menstrual function due to a glandular unbalance was made by ruling out any anatomical cause. If there was any doubt in the mind of the physician the patient was seen at a consultation clinic by the whole staff. Treatment was carried on in this way. One c.c. of antuitrin S was given the first day and 2 c.c. twice weekly thereafter. If bleeding continued past the normal time 2 c.c. of antuitrin S were given every other day. As soon as three normal periods were established the dosage was cut down to 1 c.c. twice weekly for one normal period, then 1 c.c. weekly.

It is difficult to group these cases. To me the most interesting grouping is the one of age. —Group I—those between the ages of 14 and 18; Group II—those between the ages of 19 and 38; Group III—those from 38 on through the menopause. No patients were treated for bleeding after the menopause. These were sent for further investigation by dilatation and curettage.

Group I.—There were 9 patients in this group which is again divided into two classes—A (6) those who had profuse periods at short intervals; and B (3) those who had never established a regular cycle, but would menstruate from 2 to 6 weeks and then have a period of amenorrhœa of 2 to 3 months. In Class A normal periods at normal intervals were established by the third month in 5 cases, and showed improvement in the sixth (normal interval produced, but increased flow, although not quite so severe). Two showed a tendency to relapse in September due to a great deal of swimming, but returned to normal with further injections. We shall deal with three cases in Class B separately.

CASE 1

Miss A., aged 16, was first seen after severe hæmorrhage in January, 1936. Treatment was begun in February. She had had a normal flow for the past five months, the periods being regular every four weeks and lasting for five days. Treatment was entirely stopped in October. In July the period was prolonged to ten days, due to decreasing the dose of antuitrin S too soon. In the history of this patient it was interesting to note that her mother was afflicted in the same way, (had had two curettages and eventually an artificial menopause at 36 years). No pathological condition was ever found.

CASE 2

Miss B., aged 14. Her first period came on with a severe hæmorrhage. Treatment was instituted. She had two normal periods, but observation has not been carried on long enough to give a final decision.

CASE 3

Miss C., aged 16. Treatment was begun in February, 1936, after eight weeks of continuous bleeding. April, May and June had normal periods at normal intervals. We thought that she was cured, but in July and August there was a period of amenorrhœa. She was out of town at a camp, and whether the swimming had an effect or the treatment was not continued I do not know. Bleeding began September 1st and was only terminated by dilatation and curettage on October 21st. There was tremendous hyperplasia of the endometrium. She has had two scanty periods since, and we hope that under continued treatment she will remain normal. An interesting point in her history is that she is a twin and her sister is perfectly normal.

Group II.—The results are uniform and exceedingly encouraging. Eleven patients were treated, these complaining of (1) profuse periods at normal intervals; (2) profuse periods at shorter intervals; (3) intermenstrual

bleeding. All responded in the same manner. After treatment for one month there was decided improvement. After two months the periods were normal at an interval of 26 to 28 days. After the third month the patients were discharged and remained cured. Here is a typical case history.

CASE 1

Mrs. W., aged 32 years, complained of menorrhagia for 10 years. Her periods were very profuse at 21-day intervals or less. The patient had had two curettages for this condition, one in 1926 and one in 1933, with some improvement for six months each time. She had one child in 1929. She came to the clinic, March 6, 1936. Hæmoglobin 42 per cent, last menstrual period, February 26, 1936. Antuitrin S was given 2 c.c., twice weekly. Her next period began on March 19th—3 days very profuse flow; 2nd period, April 17th—2 days, profuse flow; 3rd period, May 15th—normal flow. Treatment was discontinued after the May period as the patient did not return. On investigation in December her periods were still normal.

Group III.—The menopausal group.—Twenty patients were treated. In 15 we were able to re-establish a normal cycle which persisted. Whether some of these patients will return for further treatment next year we do not know. One patient had to return for one month's treatment after an extended holiday. Of the five remaining 1 had a hysterectomy, as she would not wait for three months to allow for treatment, which should have brought a cure as the uterus was normal on removal, and both ovaries appeared to be normal; 1 had a hysterectomy for fibrosis of the uterus; 1 went to a private doctor and had x-ray treatment; 2 have indefinite results, in that the intervals are normal but the flow is still profuse.

Conclusions.—(1) We could find no clinical difference in the effect of antuitrin S and the gonadotropic hormone. (2) The optimum dose is 2 c.c. twice weekly until the patient has had three normal periods. Diminish the dose to 2 c.c. weekly until the patient has had two normal periods, then 1 c.c. weekly. In the younger group it may be necessary to increase the dose again at any time. There should never be a sudden cessation of treatment.

THE TREATMENT OF MENOPAUSAL SYMPTOMS

These complaints are well known—hot flushes, headaches, nausea and vomiting, epigastric pain, joint pains, etc. I would like to stress two more which we found very prominent—exhaustion and nervous instability. Hot flushes are a very universal symptom, and give a clue to the extent of the vasomotor instability. We have to be content with the idea that it is this vasomotor instability which leads to the exhaustion and nervous irritability. It is interesting to note that these symptoms are not necessarily coincident with the cessation of menstruation but may occur months before or after, suggesting that they may depend on a different concentration of œstrin.

We treated 76 patients, and in all cases the symptoms were relieved. The effect in 75 per cent of the cases was miraculous. Theelin in oil, 2,000 units, was given three times a week until the symptoms were relieved, then once weekly for a varying length of time. For acute cases 4,000 units may be the initial dose. It may also be necessary to increase the dosage the week before the patients would ordinarily expect their periods. The first response of the patients is that they feel "quieter inside", "not so restless", or that the "shaky feeling" is gone. The second fact they proffer is that they are not so tired and have a feeling of well-being. The headaches and flushes disappear rapidly, and although they may persist after the first two or three injections they do not bother the patient because she feels so well "in herself". This opens up a large field of investigation as to the cause of exhaustion in women.

CASE 1

(To demonstrate the acute form).—Mrs. J., aged 40, was seen on November 11th. Her last menstrual period began on September 28th. There was a history of amenorrhœa. A complaint of exhaustion and nausea led to a diagnosis of pregnancy. She was given instructions *re* diet, rest, etc.—luminol, gr. ½, t.i.d. She was told to come back in one week, or to send a specimen for an Aschheim-Zondek test. The patient became steadily worse. On November 18th the exhaustion was more pronounced; pulse rate, 96; some swelling of the thyroid gland; sweating palms. The thought was a possible toxic adenoma, and she was sent for basal metabolism rate, which was reported as 95. The patient was not pregnant on examination. Because of her mention of night sweats, rather than any other feature, 4,000 units of theelin were given. The symptoms were relieved in 48 hours. Theelin, 2,000 units, was given twice weekly for two weeks, then once a week. The patient is now in excellent health. The periods have come on and she is not pregnant.

CASE 2

(To demonstrate the chronic form).—Mrs. C., aged 34. A history of amenorrhœa for 12 months accompanied by complete loss of energy, anæmia, pruritus vulvæ, numbness in the arms and legs, and vomiting. Pelvic examination showed the uterus to be markedly atrophied. During the month of March antuitrin gonadotropic was given three times a week with very little improvement. Beginning April 1st, theelin, 2,000 units, was given three times a week. By the end of May the patient showed definite improvement and the pruritus vulvæ was

entirely cleared up. From June 1st to December 1st, theelin, 2,000 units, was given weekly. The patient's mask-like expression has now gone; she has gained ten pounds, has a normal appetite, and no vomiting. She feels well enough to do her own work and is a different person entirely. She has not menstruated.

CASE 3

Mrs. S. A., aged 45, the wife of a Salvation Army Officer, came to us complaining of hot flushes, exhaustion and an inability to take the platform for her share of the work. Theelin, 2,000 units, was given three times a week for two weeks, and she was able to do her work as well as ever.

It is a simple substitution therapy; and yet we cannot explain the results. We vaguely suggest that it has something to do with the vasomotor system and the hypothalamus. This treatment of the menopause will mean more to women than any other discovery that has been made. The dread of the menopause has been very real to a great many professional and business women who cannot afford to be away from their work, or to be temperamental while at work. This feeling of inside shakiness and uncertainty has been the downfall of a great number of women, whether it is in regard to their jobs or their husbands. This has been a great tragedy.

I realize that there is a tremendous psychological effect from giving hypodermic injections at regular intervals which we cannot discount. Also the close cooperation between physician and patient is an added stimulus to improvement in nervous women. Assuming this to be true, there is still great benefit attributable to the hormone. In conclusion, I would like to stress the point that we did not undertake patients whose complaints were "nerves" or who had any actual nervous disorders. Any relief the patients obtained for their nervous instability was a by-product and not our original objective in giving theelin.

PRURITUS VULVÆ

The diagnosis was made on (1) the history of a constant itching of the vulva, of which the patient was conscious all day and which kept her awake at night; (2) changes in the skin and mucous membrane at the vulva which varied from a change of colour and shrivelling to a definite nodular thickening of the surface.

Nineteen cases of pruritus vulvæ were treated, the pruritus having been present from 8 months to 10 years (with the exception of one case where it came on suddenly after a hysterectomy and oöphorectomy). Six of these patients were between the ages of 23 and 33; 10 between the ages of 33 and 55; and 3 were over 55 years. In all cases relief was obtained. In all but 2 cases the patient was cured while taking the treatment. I was very much surprised at this result. The younger group responded very quickly and completely to bi-weekly injections of theelin, 2,000 units. Four patients were cured with eight injections. Two were cured in three months. One of them had to return during the Christmas season for further treatments (2 injections of 4,000 units were sufficient). This patient had had to give up her job last February because of the pruritus and was away from work for six months. This quick result was due to the fact that the pruritus was not of such long duration and the changes in the skin were changes in colour and corrugation.

The menopausal group complaining of pruritus cleared up completely, except three patients who discontinued their treatments for two months. Two of these went to the Old Country, and one discontinued her treatment because she thought she was cured. These three returned to the clinic and have again been relieved of their symptoms. These patients were given 2,000 units of theelin, three times a week, and treatment had to be continued for several months. Seven patients are still taking treatments. Of the 3 patients over 55 years of age, 2 of them are greatly improved, but some itching persists. One is entirely cured and has stopped treatment for two months.

In the middle group there were 3 cases with definite thickening of the vulva. These patients had previously had x-ray treatments; one, Mrs. B., had two series. In these cases the patients appear to be cured, the skin has become smooth, and the colour is returning to normal, but they are still taking treatment.

CASE 1

Mrs. B., aged 48 (the most severe case we treated) was seen at the clinic, November 9th, with pruritus vulvæ for more than five years. She had had two series of x-ray treatments, the first giving some relief for a short time. The last series was during the summer of 1936 and gave no relief. This patient was referred from the skin clinic because of the history that the itching was much better while menstruating. She had had three children, the youngest 10 years old. On examination the skin surface around the vagina was thickened and nodular, but with no breaking down of the surface. There was no cystocele or rectocele. The cervix was badly eroded and patulous, and there was moderate

mucous discharge. Treatment was instituted to clear up the discharge first. Silver nitrate was applied to the cervix and ichthyol tampons. The patient became steadily worse. After the third treatment, November 16th, theelin, 2,000 units, was started three times weekly. On November 30th, vaginal treatment was changed to powder insufflation, using kaolin and baking soda. The patient was much improved and could sleep. On December 10th, she complained that the powder was very irritating. All vaginal treatment was stopped. Theelin was continued three times weekly. By January 4th there was tremendous improvement; the skin surface was smooth, the patient was sleeping well, her facial expression had changed, and she had lost her fear of insanity. The discharge should be cleared up, and treatment to the cervix and dry tampon or mercurochrome pack, was suggested.

CASE 2

Mrs. M., aged 62, had suffered from pruritus of 10 years' duration. The labia were atrophied and of very pale colour. Her last menstrual period was in 1920. She was admitted to clinic on June 26th. The treatment was theelin, 2,000 units, three times a week. July 8th; she was greatly improved after 5 treatments, but was absent from July 15th. She returned to the clinic October 19th for further treatment. The pruritus had returned, and the same treatment was ordered. November 27th; the pruritus was greatly improved and treatment is being continued.

It may be said that any case of pruritus vulvæ will improve if under consistent and thorough care. This is certainly true. The removal of irritating ointments and constant washing will give a certain relief. That relief is immediate but not progressive. The relief from theelin is superimposed on that and is steadily progressive. The success of the treatment is best exemplified by the fact that the patients who thought they were cured and neglected their treatments, come back, literally begging for more.

Conclusions.—Pruritus vulvæ can be entirely relieved by injections of theelin. The dose should be large and frequent, depending on the duration of the pruritus and the condition of the skin and mucous membrane of the vulva. Treatment must not be discontinued too soon, especially in older women. Treatment should be diminished slowly.

I would like to call attention to a report by Foss, of Bristol, in the last number of the *Journal of Obstetrics and Gynæcology of the British Empire*, "Œstrin has two effects—one on the vasomotor system, one on the skin and mucous membrane, especially in the region of the vulva". In the case of pruritus vulvæ we have these two effects acting together to produce a favourable result.

AMENORRHŒA AND DELAYED MENSTRUATION

The treatment of amenorrhœa and delayed menstruation was by far the most difficult, and our reports are very premature. From the reports of Kaufman and Kurzroh it seems that any patient with amenorrhœa can be made to menstruate by using large doses of œstrin and progestin in a certain cycle. What they do admit is that this is a cyclic bleeding due to a proliferating endometrium rather than from a secreting or pregravid endometrium. This cyclic bleeding cannot be differentiated by the patient from a true menstrual cycle. It has not been proved that the bleeding will continue when treatment is stopped. The dosage being so high, the treatment is prohibitive, both in clinic and private practice, at the present time.

In our series, (*a*) 3 cases of primary amenorrhœa were treated; (*b*) 10 cases of secondary amenorrhœa of over 5 months' duration; (*c*) 11 cases of irregular delayed menstruation. Our first method was to use theelin, 2,000 units, twice weekly, for two weeks, then to skip two weeks, and begin again. No conclusive results were obtained. The second method was to use antuitrin gonadotropic, 2 c.c. twice weekly, steadily. There were no conclusive results. Then we combined these two on the principle that we would increase the œstrin level as in the proliferative phase and then change over to the antuitrin in the hope of bringing up the progestin. This has been successful in 4 cases in Class B. None of our cases of primary amenorrhœa responded to any type of treatment.

In the delayed menstruation cases, where amenorrhœa was under five months' duration, the results are bizarre. Two responded to theelin alone; 2 responded to antuitrin gonadotropic alone; 2 remained irregular, but the periods were much closer together with antuitrin; 3 responded to two or three doses of antuitrin given on successive or alternate days immediately before menstruation was expected. One of these patients who used to respond to antuitrin alone now needs 2,000 units of theelin in addition (entirely on a trial and error basis). Two have been thrown out of their cycle entirely, and have had a brownish discharge at three or four-weekly intervals. This was a most disastrous result, as these periods were accompanied by distress. There was one noticeable feature in the subjective symptoms of the de-

layed menstruation group. When antuitrin was used to bring on menstruation the patient felt as though it was coming at any moment, having headache, bloating, vague pains in the lower abdomen and backache. If theelin was given, these subjective symptoms disappeared but menstruation did not come along so quickly.

Conclusions.—Amenorrhœa is a very difficult condition to overcome when primary or over 5 months' duration. The subjective symptoms can be relieved by theelin. Treatment must be on a trial and error basis, but we suggest a combination of theelin and antuitrin gonadotropic, or S, in secondary amenorrhœa. Treatment of delayed menstruation is more satisfactory, using a combination of theelin and antuitrin. Our results were not definite enough to compare antuitrin S and gonadotropic.

Unfortunately, we had very few cases of dysmenorrhœa. One is interesting.

CASE 1

Miss C., aged 15, was examined on August 12, 1936, complaining of severe crampy pains every three or four weeks; no discharge was noticed at this time and no bleeding. Examination showed no congenital malformation. Antuitrin gonadotropic, 2 c.c., was given twice weekly. September 28th, no pains for 4 weeks. The dose was cut down to 1 c.c. twice weekly. October 5th, still no pain. November 5th—first period, normal. Another period occurred in December.

We have noted many times that women post-partum and during the period of lactation, when menstrual periods are not present, complain of joint pains, exhaustion and headaches. These pains can be very severe and can cause a great deal of discomfort. Having realized that these symptoms appear in the same way at the menopause I began to wonder if œstrin was again lacking in the system. Moore, of Chicago (*Obstetrics and Gynæcology,* 1935, 29), states that there is a sudden diminution of œstrin immediately post-partum, and that it gradually increases until the normal menstruation is established. Three patients were treated with theelin, 2,000 units, three times a week for varying lengths of time with the relief of symptoms.

We have not mentioned the basal metabolism rate in any of the cases we have cited. This is because we have never found any abnormalities greater than minus 5 and minus 8.

SUMMARY

1. Glandular therapy is proved of great value in functional menorrhagia and metrorrhagia, and the menopause, especially when accompanied by exhaustion, nervous instability, and pruritus vulvæ.

2. Its value in amenorrhœa and delayed menstruation must be investigated more extensively.

3. Dysmenorrhœa in young girls, when menstruation is being established, can be alleviated.

4. In the post-partum period, when accompanied by exhaustion and joint pains, glandular therapy is very useful.

I would like to thank Dr. Marion Kerr, Chief of the Obstetrical and Gynæcological Service of the Women's College Hospital, for her constant help and encouragement, and the Parke, Davis Company for supplying us with the hormones we used.

COLPOSCOPY.—H. Hinselmann reports from his hospital in Altona the results he has achieved in the early diagnosis of cancer of the cervix by the employment of Leitz or Zeiss instruments in the survey *in situ* of the surface of the cervix. It is brought to view as for an ordinary microscopic examination through a speculum, but the enlargement by ten times of the structures seen enables the examiner to familiarize himself with a great variety of conditions, normal and pathological, hitherto unrecognized by naked-eye examination or by palpation with one finger. After a little practice it becomes possible to distinguish correctly between physiological and pathological pictures, and to discard the common clinical diagnosis of an erosion unless there is actually loss of epithelium at a given point. The author has already in 190 cases succeeded in detecting cancer in an early stage by the system he describes, and he has found that in about one-third of all the suspicious cases in which the cervix and surrounding structures were examined *in situ* and through the instruments used, a subsequent microscopical examination of excised tissues revealed malignant disease. In addition to revealing malignant disease before it has given rise to any clinical symptoms, this system facilitates the diagnosis in more advanced stages, small ulcers and tumours being seen much more clearly than on a naked-eye examination. The author has often observed cases of malignant disease which had been overlooked by experienced gynæcologists, and the true nature of which became evident on examination by one of his assistants. This new system does not render exploratory excisions and subsequent microscopical examinations superfluous, but it greatly facilitates the discovery of suspect areas requiring excision and microscopical examination. The exploratory excision is thus rendered an even more delicate test than it was before.—*Nord. med. Tidskr.,* January 16, 1937, p. 85. Abs. in *Brit. M. J.*

THE LIPID CONTENT OF LEUCOCYTES FROM HEPARINIZED BLOOD*

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IN recent years a series of investigations on the lipid composition of the white blood cells has been designed by Boyd and associates with a view to provide a further quantitative means of measuring the activity and metabolism of these cells in diseases in which they form an important part of the pathological process. The basis of this study rests upon the fundamental work of Bloor, Corner, Okey, Snider, Boyd and certain continental authors, who have shown that there exists a relation between lipid composition and the "physiological activity" of a tissue. These fundamental studies demonstrated that a tissue which has been rendered more active through use, more active in the gymnastic sense of training, exhibits an increase in its phospholipid and frequently also in its free cholesterol content. This general physiological phenomenon is in agreement with and confirmed by the older observations that the most active tissues of the body, such as the various endocrine glands, the kidneys, the liver and the brain, contain large amounts of phospholipid. Conversely, inactive tissues, such as, for example, the jelly of Wharton,[1] contain small amounts of phospholipid and free cholesterol. A tissue which is degenerating, in contrast with one which is purely inactive, possesses in addition to small amounts of phospholipid and free cholesterol relatively large amounts of cholesterol esters, an example of such a tissue being the degenerating corpus luteum. The concentration of neutral fat depends upon the storage of fat, and appears to be largely independent of the physiological activity of the tissue. It has become customary thus, especially since the work of R. G. Sinclair, to divide the lipid content of a tissue into that part which is structural and bound with the active protoplasm and that part which is metabolic and taking part in the metabolism of the tissue or of the body generally.

Extending these basic studies to a consideration of the white blood cells, Boyd and associates have shown that the activity of blood leucocytes varies with their lipid content, or, vice versa, that the lipid content varies with the activity. These studies have yielded information of practical as well as theoretical value on the various leucocytes and on the rôle of the blood leucocytes in infective and potentially infective conditions. A review of this work has been given in a recent paper on leukæmia.[2] To the list of references therein contained may be added the investigation of Boyd and Stephenson[3] on the normal variations of the lipid content of the white blood cells, and of Boyd[4] on the relation of values for component lipids to increasing amounts of total lipid.

The chief technical difficulty in performing lipid analyses of the blood leucocytes lies not so much in the analytical methods as in the separation of the leucocytes from blood, and from a sufficiently small amount of blood to permit the test to be repeated at intervals if desired. In experiments on large animals, such as those of Willstätter and colleagues on the leucocytes of horses, the use of several litres of blood obviates many of the difficulties encountered when attempting to isolate leucocytes from small amounts of blood in man. More than 50 c.c. of blood cannot be conveniently obtained from patients, especially from patients who are definitely sick. This amount of blood, and often less, will, however, provide sufficient leucocytes to permit of complete lipid analyses, providing that all or nearly all of the leucocytes can be separated cleanly from the plasma and red blood cells.

In previous studies either sodium citrate or potassium oxalate has been used as an anticoagulant. Recently the Connaught Laboratories have prepared a highly potent, standardized form of the so-called "natural" anticoagulant, heparin. In former years the price of this substance and the frequent variability of its potency rendered its routine use prohibitive. Because of its negligible effect on the volume relations of plasma and the red cells we have now introduced it as a routine anticoagulant in the

* This work was aided financially by the Alice F. Richardson Fund of the Kingston General Hospital.

Chemical Laboratory of the Kingston General Hospital for analyses on plasma.

Experimenting with its use in leucocytic analyses, the buffy layer of white cells was invariably found to separate in a more cohesive form than that previously obtained with the anticoagulant salts. This greatly facilitated the separation of the leucocytes, since they could be readily removed with a pair of forceps. Before comparisons could be made of the lipid content of leucocytes separated from heparinized blood with that of leucocytes separated from oxalated or citrated blood it was necessary to determine if the anticoagulant used affected the results reported, as they are, in mg. of lipid per 100 g. of moist leucocytes. The immediate effect of anticoagulant salts upon the red blood cells is to cause a shrinkage of their volume, and if the same were true of the white blood cells then one would expect that the results in oxalated blood would be relatively higher than those in heparinized blood. This was actually found to be the case.

A number of 50 c.c. samples of blood were added, one-half to a flask containing 0.1 g. of potassium oxalate, and one-half to another flask containing 3 mg. of heparin. Both samples of blood were shaken and immediately centrifuged at full speed for 1 hour. The buffy layer of leucocytes was then removed with a pair of forceps, gently rinsed in the plasma, freed of plasma on a weighed watch glass with strips of cleaned, alcohol-extracted filter paper, weighed, ground with cleaned sand, and extracted with alcohol-ether. The filtered extracts were analyzed for their content of phospholipid and free cholesterol by Bloor oxidative micromethods as modified by Boyd.[5]

RESULTS

The concentrations of phospholipid and of free cholesterol in oxalated and heparinized specimens of the same samples of blood are given in Table I. In most cases the amount of leucocytes obtained from the halved 50 c.c. portions of blood was insufficient to permit of estimation of more than phospholipid and free cholesterol. In a few cases blood was obtained at phlebotomies and sufficient leucocytes isolated to allow complete analyses, including total lipid, neutral fat, total fatty acids, total cholesterol, ester cholesterol in addition to free cholesterol and phospholipid. The results in these latter few cases indicated that changes in the concentration of phospholipid and free cholesterol could be taken as exemplary of changes in all of the lipids.

The data presented in Table I clearly demonstrate that the lipid content of leucocytes reported in mg. per 100 g., moist weight, is higher in cells separated from oxalated blood than in cells separated from heparinized blood. This

TABLE I.

THE LIPID CONTENT OF THE WHITE BLOOD CELLS SEPARATED FROM OXALATED AND HEPARINIZED SPECIMENS OF THE SAME SAMPLE OF BLOOD. THE RESULTS ARE EXPRESSED IN MG. PER 100 G., MOIST WEIGHT, OF LEUCOCYTES.

	Phospholipid			*Free cholesterol*		
Number	*Oxalated*	*Heparinized*	*Difference*	*Oxalated*	*Heparinized*	*Difference*
1	456	302	−154	155	130	− 25
2	577	698	+121	203	225	+ 22
3	658	658	0	210	232	+ 22
4	755	328	−427	206	196	− 12
5	796	655	−141	207	201	− 6
6	833	537	−296	257	148	−109
7	1,080	698	−382	540	403	−137
8	1,183	656	−527	310	187	−123
9	1,470	868	−602	548	397	−151
10	1,520	970	−550	830	617	−213
11	1,545	1,532	− 13	405	386	− 19
12	1,590	1,290	−300	421	327	− 94
13	1,590	1,560	− 30	392	380	− 12
14	1,702	1,395	−307	465	377	− 88
15	1,762	1,790	+ 28	441	464	+ 23
16	1,920	1,020	−900	490	362	−128
17	1,980	1,700	−280	640	490	−150
18	2,020	1,990	− 30	476	467	− 9
Mean	1,302	1,035	−267	400	333	− 67

was true in 15 out of 18, or 83 per cent, of the cases investigated. The concentration of phospholipid of cells separated from oxalated blood extended from 456 to 2,020 mg. per 100 g., moist weight, and when separated from heparinized blood from 302 to 1,990 mg. The average value for phospholipid of cells obtained from oxalated blood was 1,302 mg. per 100 g., moist weight, and from heparinized blood 1,035 mg. In two cases there was slightly more phospholipid in the heparinized portion, and in one case the values were equal, but it is quite evident that one may conclude that the phospholipid values of leucocytes expressed in terms of mg. per unit moist weight are higher in oxalated than in heparinized blood. The differences varied considerably from case to case, depending upon the concentration of the anticoagulant salt and upon the time which elapsed before the extracts were made. The average difference was 267 mg. less phospholipid in the cells of heparinized blood, or approximately 20 per cent less than that found in the cells of oxalated blood.

The average concentration of free cholesterol was 400 mg. per 100 g., moist weight, of leucocytes in cells obtained from oxalated blood, and 333 mg. in cells separated from heparinized blood. The average difference of 67 mg. may be calculated to have been 17 per cent of the mean value for free cholesterol of the cells isolated from oxalated blood. In 83 per cent of cases also there was less free cholesterol in leucocytes of heparinized than of oxalated blood.

The explanation of these differences is apparently that oxalate, and presumably also other anticoagulant salts, when added to blood does not immediately diffuse across the cell wall of the leucocytes, and by increasing the osmotic tension outside draws water into the plasma. As a result there is less water and relatively more lipid left in the white cells, although there would presumably be no increase in the lipid content expressed in mg. per unit dry weight. It has been found that red blood cells on standing a day or so in contact with potassium oxalate gradually regain the volume originally lost on adding the salt, and that the lipid content returns to the initial value. Presumably a similar situation would prevail with the leucocytes, but this is largely of academic interest since extracts of the leucocytes are generally prepared immediately or within a few hours of the drawing of blood.

The practical conclusion to be drawn from these data is that one must consider the anticoagulant used in evaluating the significance of estimated values for the lipid (particularly phospholipid, since this is the lipid of most prognostic significance) content of the white blood cells. This is especially true when only one estimation is made, since with repeated estimations the significance lies in whether the values are increasing or decreasing. One may, however, draw certain conclusions prognostically in infected cases from a single estimation of the phospholipid content of the blood leucocytes and the prognosis to be drawn from various phospholipid values has been indicated by Boyd[6] for cells separated from oxalated or citrated blood. If heparinized blood be used, then the various ranges given before[6] should each be reduced by approximately 20 per cent.

SUMMARY

The concentration of phospholipid and of free cholesterol per 100 g., moist weight, of leucocytes was found lower in white blood cells separated from heparinized than from oxalated blood, the average decrease being 20 per cent.

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AUDI ALTERAM PARTEM

When quacks, as quacks may, by good luck, to be sure,
Blunder out at hap-hazard a desperate cure,
In the prints of the day, with due pomp and parade,
Case, patient, and doctor are amply display'd:—
All this is quite just—and no mortal can blame it;
If they save a man's life, they've a right to proclaim it:
But there's reason to think they might save more lives still,
Did they publish a list of the numbers they kill.—Samuel Bishop.

THE GYNÆCOLOGICAL AND ENDOCRINOLOGICAL ASPECTS OF STERILITY*

BY HENRY A. BARON, M.D.

Montreal

THE subject of sterility could have been covered on one printed page, only a generation ago. During recent years, however, following the pioneering work of Frank in endocrinology, of Rubin in the development of the test for tubal patency, simplified methods of basal metabolism determination, the work of Hühner and Moench in semen studies and the investigation of ovulation by means of the suction-curette, the study of sterility has made rapid strides, culminating in an excellent monograph by Meaker[1] only three years ago.

We cannot agree with Meaker in his definition that "sterility is the inability to initiate the reproductive process on the part of a couple who have desired and attempted to do so for the period of a year". This definition excludes those cases in which pregnancy is terminated spontaneously before the fetus is viable. It is now generally well known that many abortions are the result of abnormal development of the products of conception and that in some instances the causative factor may be found in the ovum or sperm. Possibly, also, the development of monsters or other abnormalities may be due to similar disease in the ovum, sperm or genital tract of man or woman. Habitual aborters, therefore, should be included and investigated as one would a case of sterility. Hence, sterility is the inability of a couple to effect or complete a pregnancy during the period of one year. This definition rightfully includes the husband in sharing the responsibility since in 30 per cent of the cases he is entirely responsible. The sterility is called primary when conception has never occurred, and secondary if one or more pregnancies are followed by a period of barrenness of one year's duration and further conception is apparently impossible.

Absolute sterility is that condition in which anatomical or genetic faults or pathological changes make pregnancy impossible, but relative sterility implies that conception is impeded or interfered with by various factors. We may think of fertility as having a threshold, and that when the sum total of male and female factors hindering the migration of the spermatozoa in their attempt to reach the ovum and the nidation and development of the zygote are sufficient to fall below this threshold, then sterility results.

CAUSES OF STERILITY

In 70 per cent of the cases there is no single absolute cause, and therefore the sterility is only relative. It is usually due to the combined action of many causes, each of which alone does not cause sterility. It is seldom that the male or female alone is totally responsible. A relative sterility in one partner may be overcome by a high fertility in the other. In a complete study of 25 cases, Meaker found 43 factors in the male and 82 in the female, making an average of five factors in each case. The work of Meaker brings to light four aspects of the causation of sterility: (1) local genital abnormalities; (2) the influence of constitutional depressions; (3) the multiple incidence of etiological factors; (4) the division of responsibility between male and female. He found four abnormal conditions of the reproductive organs occurring with marked frequency—developmental arrest, hostility of the endocervical mucus, tubal blockade, and mechanical interference with ovulation, such as occurs in a pelvic inflammatory disease where the tunica is thickened.

Constitutional factors come under the following headings:—(1) endocrine disorders—pituitary, thyroid and ovarian are the main ones; (2) chronic intoxications, which include systemic infections that lower vitality and produce anæmia; (3) metabolic faults, which include diabetes and obesity; (4) general debility from any cause.

Primary anterior pituitary deficiency, when of a mild type, is usually responsible for the development of the well-known Fröhlich syndrome. The patient is short, exhibits mammary-mons-girdle obesity, a male type of hypertrichosis, and genital hypoplasia with menstrual irregularities. In severe cases diminution in the

* Read before the meeting of the Montreal Clinical Society, March 3, 1937.

fields of vision occurs, and there is also an increased sugar tolerance. Goldzieher[2] reported a fall in the specific dynamic action of protein in pituitary deficiency from the normal rise of 16 per cent to only 3.8 per cent. Four cases of pituitary tumours showed a rise of 35 per cent and 17 cases of primary hypogonadism showed an average increase of 20 per cent (Bland). This is in line with the evidence that ovarian failure is often associated with hyperfunction of the anterior lobe of the pituitary. Hypopituitarism is associated with an absence of the anterior pituitary gonadotropic hormone and a lowering of œstrogenic substance in the blood.

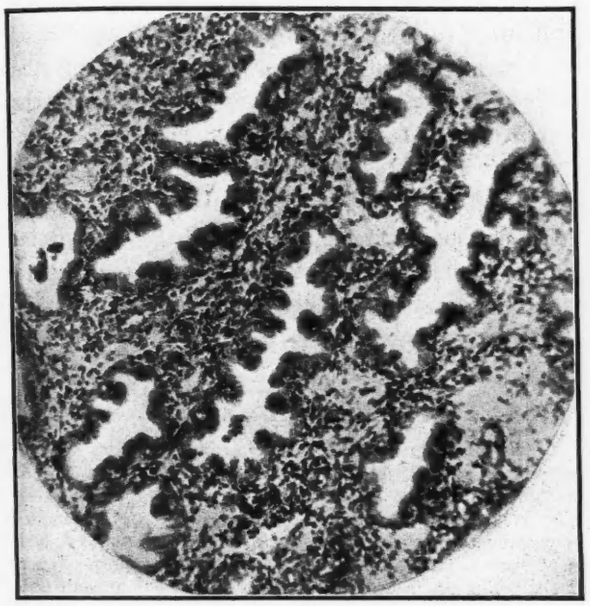

Fig. 1.—Active secretory, eight days before next menses. Note papillary infolding of epithelium of central gland, giving a saw-toothed appearance. The nuclei are basal. This endometrium is actively functioning under the influence of progestin. (x 150).

(Somers H. Sturgis, M.D. and Joe V. Meigs, M.D., Endometrial cycle and mechanism of normal menstruation, *Am. J. of Surg.*, 1936, **33**: No. 3, 377).

Frank[3] has designated this as the pseudo-male type of female. She is heavy-boned, has a deep voice; the clitoris is enlarged, the vulva is retrodisplaced, and, instead of presenting somewhat anteriorly, points downward towards the heels. Labour is usually protracted in these patients if they do become pregnant.

Primary ovarian failure is represented by the extremely feminine type—emotionally as well as physically. Frank includes these in his cases of infantilism. "The women are usually attractive, petite, vivacious, neurasthenic, and poorly resistant to infection. They present a delicate bony framework, narrow subpubic angle with a high symphysis and prominent vulva. The vagina is underdeveloped as shown by the shallow fornices. The cervix is small, long and narrow, often with a pinpoint os." The uterus is usually smaller than normal, the ratio between the size of the fundus and cervix being altered. The utero-sacral ligaments are short, thick and inelastic. Menstruation is irregular and often scanty. Hormone studies reveal an absence of the premenstrual rise in œstrin level in the blood and a compensatory high anterior pituitary gonadotropic hormone—an attempt at compensation. The absence of ovulation in these cases

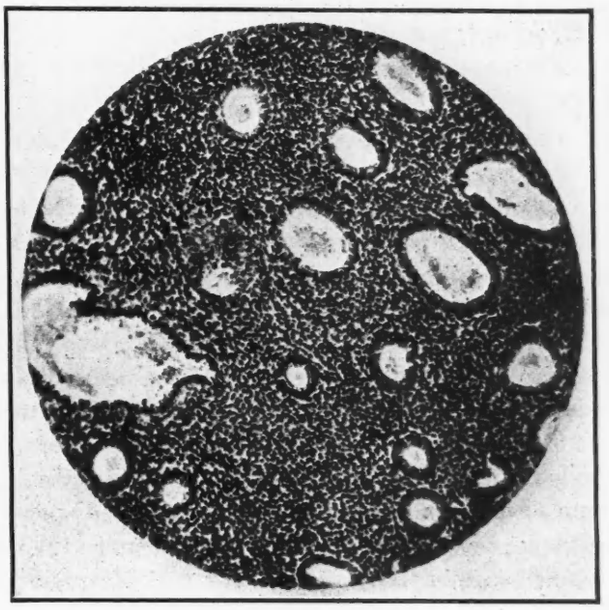

Fig. 2.—Anovular menstruation. This endometrium was removed on the 24th day of a normal 28-day cycle: it presents the typical features of the interval phase and shows no evidence of having been under the influence of the corpus luteum hormone. One of the glands is larger than normal. (x 80).

(T. N. A. Jeffcoate, M.D., Sterility due to ovarian dysfunction, *Brit. M. J.*, 1935, **1**: 345).

may also be inferred by the absence of *Mittelschmerz*, and the absence of spotting or mucoid discharge about two weeks before the expected period. Endometrial studies during the last week of the cycle, that is, during the secretory phase, show evidence of corpus luteum activity only if ovulation occurs. The endometrium may be obtained by means of the suction-curette[4] which can readily be passed into the uterus as an office procedure. Recent work by Bland *et al.*,[5] Novak[6] and Mazer,[7] has revealed that a surprisingly large number of women menstruate without endometrial or hormonal evidence of

ovulation. Jeffcoate,[8] too, has reported cases of sterility due to disorders of ovulation.

Thyroid dysfunction is not infrequently a cause of sterility in either the male or female. In a recent case I found the basal metabolic rate to be minus 30 per cent in the husband. Disturbances in the menstrual cycle are very common, and some cases of hyperplastic endometritis associated with profuse bleeding are associated with hypothyroidism. These patients are always sterile.

Local causes in the male include: (1) deficiency of the spermatozoa in number, morphology, motility and endurance; (2) obstructive lesions preventing the emission of the sperm; (3) congenital deformities preventing normal coitus; (4) hypogonadism, either congenital or acquired, after disease such as mumps.

Biochemical studies of human semen by Miller and Kurzrok[9] have shown that sperm readily penetrate normal cervical mucus but not abnormal or infected mucus. They explain this observation on the basis of electrical potential. The pH of mucus is 9 to 9.6, semen 7.8 and vaginal secretion 3.5. The potential between semen and cervical mucus has been measured and found to be 3 to 5 millivolts, sufficient to cause orientation and migration of the sperm cells to the cervix. In endocervicitis the cervical muco-pus may become acid and repel the spermatozoa, which are unable to survive more than a few hours in the vaginal pH of 3.5. Extensive work by Moench and Holt on human spermatozoa reveals that the average volume of semen is 4 c.c., with a count of about 100 million sperm to the c.c. Since they find less than 20 per cent abnormal sperm heads in normal fertility cases it is their belief that variations in size and shape of sperm heads are indicative of a reduction in fertility level. In studying semen the couple should be advised to bring a fresh specimen, collected in a washed and dried condom or in a sterilized dried bottle, and kept at room temperature. It is now well known that the powder used to preserve condoms will kill sperm, and that body temperatures do not prolong their life. The fact that the testicles are in the scrotum which is below body temperature favours spermatogenesis. Since the sperm may be antagonized by a hostile cervical mucus the Hühner test is then performed. An hour after coitus the semen is aspirated from the posterior vault of the vagina and also from the cervical canal. The woman has been instructed to lie on her back with a pillow elevating her hips for at least half an hour after coitus and then to come to the office for the test. Very often the cauterization of an infected cervix, combined with mildly alkaline douches, which should be taken an hour before coitus, will help to clear up a hostile cervical discharge.

The element of guesswork in evaluating the status of the tubal lumen has been completely eliminated since the work of Rubin in utero-tubal insufflation. This test is now a simple office procedure, although not without danger in inexperienced hands, since occasional fatalities have followed its use. The test should be performed during the second week of the menstrual cycle and when pregnancy, growths and inflammatory conditions have been excluded. It is wise to prepare the patient for the test by giving her codein and atropine to ease the pain and to prevent tubal spasm. Aside from its diagnostic value, the test serves as a therapeutic procedure, since flimsy adhesions may be relieved by repeated insufflations.

CASE REPORT

Mrs. M., aged 28, married four years, no contraception, never gravid, menstrual history normal. A twisted dermoid cyst of one ovary was removed the year previously; at that time the other ovary and tube were normal. Physical examination of husband and wife was normal except for a small erosion of her cervix. The Hühner test revealed normal sperm in the cervix after coitus; the Rubin test showed closed tubes at 180 mm. of mercury. The cervical erosion was cauterized, and after it had healed the Rubin test was repeated at short intervals. Finally gas entered the abdomen at 120 mm. and then at 80 mm. of mercury. The patient was advised to attempt conception at the usual time of ovulation, that is, twelve to eighteen days before the expected mensis, at two-day intervals. She was told to lie on her back with a pillow under her hips for an hour after coitus. She was lost sight of until two months later when she was admitted to the ward with pernicious vomiting of pregnancy. She responded to treatment and was delivered seven months later of a normal child.

In this case one may well assume that a few flimsy adhesions developed with the localized peritonitis which occurred when the dermoid cyst became twisted or during the operation for the removal of the cyst. Fortunately we were able to break down these adhesions without a laparotomy. The use of lipiodol should be limited to those cases in which the tubes are definitely known to be closed. We have seen severe pelvic infections resulting in closure of

the tubes, and even deaths have been reported following its use. Lipiodol is useful in localizing the site of tubal blockade before operation.

Fibroids, as a rule, do not play an important part in preventing conception, except when by encroaching on the uterine cavity they prevent migration of the sperm or cause occlusion at the cornua of the uterus. Recently we found a tongue-like submucous polyp in a case of sterility. Although the polyp was projecting from the cervical canal, in all probability, while in the uterine cavity, it impeded the ascent of the sperm sufficiently to prevent conception. This case reveals the value of exploration of the uterine cavity when no cause for sterility can be found. We do not advocate the use of a sharp curette, but merely exploration with a sound, placental forceps and dull curette.

THE INVESTIGATION OF A STERILE COUPLE

1. *The family history.*—Important here is a careful description of the members of the immediate family. The presence of a familial tendency to endocrine abnormalities may be brought out.

2. *The personal history.*—There may be a history of exposure to the heavy metals, occupational hazards, a history of mumps or chronic wasting disease. The menstrual history may reveal evidence suggesting anovulation—missed periods or functional bleeding may well be the result of the persistence of enlarged follicles and lack of ovulation. The husband is questioned privately—he may recall having had a gonorrhœal infection.

3. *Marital history.*—The frequency of coitus and its relation to the menstrual cycle are important. In a recent case, an extremely religious Jewish husband abstained from sexual relationship with his wife until two weeks after she had completed a menstrual period lasting six days. According to our present views on ovulation this was too late for conception to take place. Cases of this type, of course, are rare, since the Hebrew law insists on abstinence for only one week after the menstrual period.

4. *General and local physical examination of husband and wife.*—This is important since it may reveal gross abnormalities, foci of infection or evidence of previous pelvic infection. The usual stigmata of endocrine disease are carefully sought after along the lines indicated above.

5. *Sperm examinations, as described.*

6. *Uterotubal insufflation* after semen studies have revealed the presence of a sufficient number of normal spermatozoa. The test should be repeated several times if occlusion is present before giving up the case as hopeless.

7. *Tests to determine the presence of endocrine disturbances in the sterile couple.*

These include (*a*) the basal metabolic rate; (*b*) the dynamic action of protein; (*c*) weekly study of œstrin levels in the blood; (*d*) study of gonadotropic hormones.

In an investigation of 300 couples for sterility Stein and Leventhal found the major female causes distributed as follows.

	Percentage
Bilateral tubal occlusion	20
Previous abortions	16
Chronic endocervicitis	16
Uterine hypoplasia	14

Although complete tubal block was not present, a large percentage of the cases revealed the presence of salpingitis, perisalpingitis and pelvic peritonitis.

Many cases of sterility cannot be explained in the present light of our knowledge. Doubtless the newer advances in endocrinology and reproductive physiology will help to solve some of our problems. That a specific immunity exists in some cases is not beyond the realm of probability since by changing partners conception many times occurs after so-called sterile matings. Horticulturists have long known that apple orchards which become sterile after a number of years, will bear fruit again when a new strain of pollen is introduced by a graft from another orchard.

TREATMENT

The couple is advised that treatment may be extended over a period of two or even three years. A lecture to them on the physiology and conduct of a normal sex life is in order.

The husband.—When the sperm is found to be below par the husband is referred to a urologist for investigation. His basal metabolic rate should be taken, and thyroid medication given when indicated, the dose being increased from a grain of the extract daily until the metabolic rate reaches normal and is kept so. General constitutional measures are taken. A high-vitamin high-protein diet, combined with less smoking and drinking, proper exercise, and

sexual rest will all help to increase his fertility.

The wife.—Here, too, measures are taken to improve the general constitutional level. Thyroid extract is given when indicated. Local measures may have to begin at the hymen, strange as this may seem. In one woman, sterile for two years, we had to incise an intact hymen. Hence nothing should be taken for granted. Erosions of the cervix may readily be healed by the electrocautery and alkaline douches. We do not believe that retroversions *per se* cause sterility, although replacement of a retroverted uterus may promote healing of the cervix in stubborn erosions by relieving pelvic congestion. Uterine fibroids when associated with repeated abortions should be enucleated. Chronic pelvic inflammation may be alleviated by rest and the judicial use of heat, internal and external. The short-wave diathermy, the Elliott machine, or merely the use of a continuous hot douche will help to resolve inflammatory exudates. In prescribing the prolonged continuous hot douche careful instructions are necessary. The patient is told to lie on her back, either in bed or in the bath tub, her hips being slightly elevated on a pillow or folded blanket over which is placed a rubber sheet. The douche bag may be slipped over the faucet in the bath tub and the water allowed to run directly through it and the rubber tubing, or the bag may be removed and the rubber tubing slipped directly over the faucet. The water is allowed to run as hot as can be borne for twenty minutes. Vaseline may be spread over the vulva and thighs if the patient is unable to bear the heat of the water as it runs out of the vagina. This treatment should be repeated each night before retiring, and may have to be continued for weeks. A continued normal temperature following pelvic examinations, subjective symptoms, and the blood sedimentation rate will tell us when it is safe to do the Rubin test. If, after repeated tests, the tubes are still closed an operation may have to be resorted to.

ENDOCRINE TREATMENT

Glandular hormonotherapy is still in its infancy. In the amenorrhœic cases tremendous doses of female sex hormone are required to produce one menstruation, and, as a rule, have to be repeated each month. The expense at present precludes its general use. This holds true also for the use of the pituitary hormones. Admitted that the newer hormones are now biologically tested for potency and that their physiological effects are beyond doubt, yet the results from their use in practice are not what one would expect.

In view of the close relationship that exists between the œstrogenic hormones and the carcinogenic factor, such as exists in coal tar, hormonotherapy may not be without its dangers. The use of large doses of œstrin is to be deplored until more is known of the possible later results. Our position at present can best be expressed in the words of Frank *et al.*[10] who say "It is difficult to keep one's footing in a stampede, and practically impossible to think or plan connectedly during a panic. Therefore, the members of the medical profession as well as the public who have been caught in the whirlwind sweep of this new medical advance have lost all sense of proportion, of direction and balance, whenever the subject of endocrinology is touched on. In spite of the turmoil, real progress can be recorded, often unheard, because of incoherent babble and ballyhoo which is more vocal than constructive and conservative advances."

In conclusion, then, we feel justified in stating that endocrinology, although promising as it may seem, can, at best, play only a partial rôle as far as sterility is concerned. When the theoretical zenith of perfection will have been achieved, only 10 to 15 per cent, at most, of our cases will be aided by endocrines. The tide of enthusiasm which hailed the discovery of our sex hormones is receding. Collip has found anti-hormones which neutralize the primary effect of the hormones. The growth of breast carcinomata in rats has been reported following the administration of only 10,000 units of œstrin. Where it will all lead to no one knows, but in the meantime we are well advised to go slowly.

In the final analysis, the major causes of sterility are still obstructive—whether congenital or acquired, through new growth or inflammation anywhere in the genital tract, from hymen to tubal fimbriæ. It must be remembered, too, that tubal closures are frequently the result of abortions which become mildly infected. They will be with us only so long as knowledge of the control of conception is limited to the favoured few. When birth

control makes abortions unnecessary either for social, economic or medical reasons, we will have made an important forward step in preventive medicine, and, paradoxical as it may seem, will have lowered the incidence of sterility. The major problem of sterility, however, always has been, and always will be, a gynæcological and urological one, and only by the continued cooperation of these two specialties will the greatest good be achieved.

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CONTACT ECZEMA FROM DYED CLOTHING*

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THE clinical picture to be described here was first observed by us in the Dermatological Clinic of the Montreal General Hospital in 1935. Since that time we have been able to observe in our Clinic and in private practice 6 clearly defined cases which have resulted from a hypersensitivity to contact with dyed clothing, and which form the basis for this communication. We do not recall having clearly identified this particular syndrome before two years ago, and the paucity of the literature referring to such cases suggests that their incidence was very slight until the past few years.

This type of eczema is characterized by its occurrence only in women, by its localization in those parts in immediate contact with the dyed material, and, further, by the clinical history obtained from the patient that the eruption had followed shortly after the wearing of a new, or re-dyed, dress. In all cases recorded here the fabric material in the dress was a silk crêpe. The dermatitis was always confined to the axillæ, the front and back of the chest, corresponding exactly to the part not protected by the slip and coming into contact with that part of the dress, the upper arms and the antecubital fossæ, the lateral aspects of the neck, with occasional involvement of the face. Hence, the lower border of the eruption was frequently sharply defined from the normal skin by a horizontal line extending from axilla to axilla, anteriorly and posteriorly.

The character of the eruption was usually that of an acute, erythematous, diffuse inflammation in the areas mentioned. In most of our cases the eruption was most marked in those parts where hyperidrosis was present, namely, in the axillæ, and, also, in the antecubital fossæ where the skin is particularly prone to react on account of its excessive thinness. In some cases the eruption was finely vesicular, and in places marked exudation occurred. Intense irritation was usually present. In one of our cases the eruption had persisted for a long period of time, and, when seen, multiple, small, follicular abscesses were present on the back, along with a marked erythematous scaling, and the condition simulated a seborrhœic eczema.

The cause of the eruption was usually suspected from its character and from the clinical history. Thus, in three of our cases it followed within a few days after the wearing of a new silk crêpe dress. On the other hand, in three cases it followed contact with a re-dyed dress. It is, further, of interest to note that the colour of the dyed dress was black in three cases, blue in two cases, and brown in the last case.

Patch tests were done in order to confirm our diagnosis of a dermatitis from dyed clothing. In all six cases clearly positive reactions were obtained. The value of the patch test here was clearly demonstrable as a means for determining the causative agent, inasmuch as a number

* Read before the Dermatological Section of the Canadian Medical Association at Ottawa, June 24, 1937.

From the Department of Dermatology, Montreal General Hospital.

of dyed materials had been worn, to any one of which the individual might have become sensitized. In our patch test we confined ourselves to the actual dyed materials worn. In one case the clinical picture suggested a possible mycotic axillary infection, but microscopic search for a fungus was negative, and positive patch tests of the dress material confirmed the actual diagnosis.

The following cases are cited.

CASE 1

A.B., female, aged 35, presented herself at the clinic in December, 1935. She had a markedly pruritic, erythematous, vesicular dermatitis involving the antecubital fossæ; the front and the back of the chest were sharply demarcated from the normal skin at the upper border of her slip, with a markedly inflammatory and exudative reaction in both axillæ (Figs. 1 and 2). The area of skin beneath the shoulder strap was quite normal and sharply defined as a narrow strip from the adjacent inflammatory skin. She had acquired a black silk-crêpe dress about two weeks previously, and the eruption had gradually developed shortly after the first wearing. A patch test with the dress material was markedly positive at the end of 48 hours, as shown in Fig. 2. She discontinued wearing this garment, and under soothing applications the eruption gradually disappeared in three to four weeks.

Fig. 1, Case 1.—Showing marked eczematous reaction involving the upper back, axilla and arm. The sharp line of demarcation is clearly seen.

Fig. 2, Case 1.—Showing marked eczematous reaction in the axilla and left antecubital fossa. A positive patch test is shown in the middle of the left upper arm, 72 hours after contact with black silk-crêpe material of her dress.

CASE 2

I.E., female, aged 30, developed an acute, inflammatory eczema on the exposed parts of the chest, neck and back, above the upper margin of the slip in February, 1936. She had had a powder-blue silk-crêpe dress dyed black, and three weeks after wearing it, on a number of occasions, her skin became markedly irritated and inflammatory. A patch test was done with a piece of the dress material, and 48 hours later this occasioned a markedly papulo-vesicular reaction. Under soothing applications, the eruption subsided within two weeks. She gave this dress to a niece, who has worn it for a number of months without any evidence of hypersensitivity.

CASE 3

H.E., female, aged 35, developed an eruption in August, 1936, over the chest, back, axillæ and upper arms, following the wearing of a blue silk-crêpe dress. This eruption was recurrent at intervals over a period of four months, when she was seen by Dr. B. Usher. A patch test with a small piece of her blue dress gave a positive reaction. The condition gradually subsided on removal from contact with the dress and soothing applications.*

CASE 4

H.P., female, aged 47 years, in October, 1936, came in with an acute, irritative, exudative eczema of four days' duration, involving both axillæ. She said that she had had similar recurrent attacks over the past year. There was a history of contact, at intervals, to a dress-shield, a blue and a black silk-crêpe dress. In order to ascertain the cause patch tests were done, using material from her rubberized dress shield and from the blue and the black dresses. One day later, a marked reaction to her black dyed silk material was obtained, which three days later had become markedly accentuated. The other two tests evoked no reaction. These patch tests were valuable in that they were the means of identifying the exact causative material. This eruption was quite persistent, and only disappeared at the end of one month, following the use of soothing lotions and x-ray, and the elimination of the cause. It is interesting to note that this patient over the past four years had consulted me on various occasions for acute external irritant reactions on the arms which usually followed contact with wool, and it would seem very probable, in the light of her recent finding, that the dye in the wool of her sweaters may well have been the true cause. There was also a history of hay fever, and she, probably, had a polyvalent hypersensitivity.

CASE 5

I.W., female, aged 34, in November, 1936, presented a markedly scaly, intensely pruritic eczema, involving the back, chest, axillæ and antecubital fossæ in a somewhat diffuse process, and characterized by marked secondary pustulation. The diagnosis first made was that of a seborrhœic eczema with secondary impetiginization. The condition subsided somewhat under treatment, and had nearly disappeared when, in the early part of December, she had a marked exacerbation. At this time, attention was drawn to the fact that she had had a silk-crêpe dress, two months previously, re-dyed blue. She had been wearing this dress and also a green dress, and both of these were suspected. A positive reaction resulted from a patch test, using the blue fabric, whereas the patch test with the green dress

* Courtesy of Dr. B. Usher.

material was completely negative. She was forced to go to bed for three weeks, on account of which she lost her position, and a period of two months elapsed before cure resulted.

CASE 6

B.W., female, aged 17, was seen in January, 1937, on account of a scaly eczema of the face, neck, upper back, upper chest, arms, and antecubital fossæ. There was a history of attacks in the past, and she had been found sensitive to horsehair, corn and tomatoes by cutaneous scratch tests. There was also a history suggesting that these attacks might have been due, on previous occasions, to fox fur. She also stated that as an infant she had been found sensitive to eggs and wheat. At the time of her present attack possible suspected causes were her face powder, the dyed squirrel collar of a coat she had been wearing, treated lamb fur, and a brown dress, originally green, which she had recently re-dyed. Patch tests, using small portions of all these materials, were made. These tests were all negative at the end of 24 hours, but at the end of 72 hours markedly positive reactions were obtained to the brown silk and the dyed squirred fur. On discontinuing wearing her brown dress, under soothing applications, the eruption disappeared from the arms and the axillæ. She did not remove her fur, and the eruption persisted on the face and the upper part of the neck over a month's time, when she no longer wore her winter coat. Here it would seem that we were dealing with polyvalent hypersensitivity, and that both the dye of the fur and the dye of the dress material were the causes of her eczema.

Whereas eczema from dyed furs has been recognized for many years, and is exceedingly common, eczema resulting from contact with dyed clothing has received little mention in the literature. The combined statistics from the Labour Commissions of New York and Ohio show that in 1934, of about 1,600 cases of occupational dermatitis 45 were attributed to dyed fabrics. Schwartz[1] found that among 36 dyers in a factory, working in chrome and chrome colours, two cases of dermatitis of the hands resulted, and patch tests showed that they were both hypersensitive to the chrome colours. Lomholt, in 1931, reported a characteristic case due to a dyed dress. Simon and Rackemann[2] have reported the case of a man who had eczematous eruptions as the result of dyes in his clothing, stockings, garters and hat bands, in the upholstery of his furniture and automobile, and also in his wife's dresses. Blumenthal and Jaffe[3] reported two cases, in one of which a reaction was caused by blue clothing and in the other by brown clothing. More recently, attention was directed to this type of eczema by Bonnevie and Genner,[4] who observed 15 cases, in all of whom the dress material had been dyed blue.

COMMENT

Dyed fabrics, such as dyed dresses, dyed socks, dress shields, and collars may cause dermatitis following a short or prolonged contact. When it is considered that most fabrics are dyed, it must be realized that only a very small percentage of people is affected by dyed fabrics. It is usually necessary to ascertain the actual cause by making patch tests with the dyed fabric which is worn. According to Schwartz,[1] when a dye is the cause of a dermatitis it usually comes off the fibre and on to the skin. The garments are then said to "bleed".

In the actual processing of these dyes many different chemicals are used which may also be important factors in the production of this allergic reaction. Thus, in the actual dyeing of silk, frequently chrome dyes are used involving the presence in the dye of bichromate of potash. In other dyes, different acids and alkalis and other chemical agents are also used. Then, again, certain states of the skin may tend to promote such a hypersensitivity. Thus, the hydrogen-ion concentration of human sweat varies from pH 4.85 to pH 7.4, and the hydrogen-ion concentration of perspiration varies in different parts of the body at the same time. Some dyes are more readily dissolved out of fabrics by acid than by alkaline perspiration and vice versa. Then, some dyes are fat-soluble, and a high sebum content in the perspiration may dissolve them out of the fabric. Schwartz[1] suggests that where patch tests are negative in the presence of an eczema very probably from dyed fabrics, that the material used in the patch test should be moistened in the individual's own sweat, obtained from the axilla.

SUMMARY

Six cases of eczema due to dyed clothing are recorded, through which attention is drawn to a well-defined dermatitis of the skin, due to hypersensitivity to dyed clothing, and recognized by a characteristic localization, by a history of recent wearing of a dyed silk dress, and the cause corroborated by positive "patch test" reactions. These dye-stuffs which may be irritant in action are not "fast dyes" and are, therefore, usually the cheaper qualities.

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TRANSIENT RECURRENT BUNDLE-BRANCH BLOCK*

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RECENTLY Kurtz[1] called attention to the relatively infrequent occurrence of transient bundle-branch block and to the few cases of this kind that have been reported. Transient bundle-branch block has been observed in toxic and infectious states, such as diphtheria and rheumatic fever, in congestive cardiac failure, following coronary thrombosis, in conditions when the heart is under stress of increased demand as in tachycardia, as a result of vagotonic influences, and after large doses of digitalis. This temporary disturbance of the conduction mechanism occurs in patients showing definite structural myocardial changes, but may also appear as a purely functional phenomenon without demonstrable heart disease. In all of the 6 cases reported by Kurtz advanced heart disease was present. In our case bundle-branch block appeared and disappeared several times following a coronary thrombosis, and finally became permanently established.

CASE REPORT

J.D., aged 59, a Polish Jew, came to Canada at the age of 33. He recalled no illness of youth, and enjoyed good health, working first at leather goods, later as a tailor, and, finally, as a second-hand dealer until 1931, when he became totally disabled.

Personal history.—His appetite was good; bowels regular. He smoked ten cigarettes daily, took no alcohol in any form; slept on one pillow; had lost twenty pounds in the two years from 1934 to 1936, had had no cough, and never noticed swelling of ankles; diuria was noticed five to six times, and nocturia, once or twice, for the past two years.

Family history.—His father died at 70, cause unknown; mother died at 50 of heart disease; three sisters and two brothers are alive and well; one daughter died at 20 of heart disease; one son died at 28 of pulmonary tuberculosis; his wife and three children are alive and well.

Present illness.—He first consulted a physician in March, 1933, at the Herzl Dispensary, for dizziness, palpitation, substernal pain, and dyspnœa on exertion. He was found to have hypertensive cardiovascular disease, left ventricular enlargement, electrocardiographic evidence of ventricular myocardial disease, and symptoms of angina pectoris. Nitro-glycerine relieved his pain, and he used 3 to 6 pills per day; over a period of two and a half years his blood pressure varied from 180 to 250 systolic and 100 to 140 diastolic. His symptoms disabled him totally for work. On January 9, 1936, while walking home, he had an attack of angina pectoris of an unusually severe degree and of a persistent type. By stopping frequently to rest he eventually made his way home where a physician saw him, administered ¼ grain of morphine, and sent him to the Jewish General Hospital. The pain had lasted five hours when he arrived in the hospital ward.

Physical examination.—A well-nourished, short, and stocky man, very restless, and covered with a cold sweat. He had a frequent harassing cough, dyspnœa, and appeared in great distress. Cyanosis of the lips, fingers, and nail beds was present. His pupils were contracted, the right smaller than the left, and responded sluggishly to light. His tongue protruded in midline and showed no tremor; the tonsils appeared infected; many teeth were missing and the rest in a dirty, carious state; there was marked pyorrhœa. The thyroid not enlarged; no clubbing of fingers; and no peripheral œdema. Moist râles were present at both bases. The edge of the liver was felt five cm. below the costal margin. The reflexes were normal. The radial arteries were definitely thickened; temporals, prominent. Blood-pressure on admission was 150 systolic and 95 diastolic. Heart was moderately enlarged; the sounds were distant; there was a blowing systolic murmur over precordium, best heard over the apex; rhythm was normal.

Urine was clear amber in colour; specific gravity 1.030; acid reaction; a trace of albumin, but no sugar. Microscopic examination revealed two red blood and two white blood cells per high-power field. Blood examination: 5,400,000 red cells; hgb. 85 per cent; white blood count, 8,800 to 10,300. X-ray showed moderate enlargement of the heart, tortuosity of the aorta, and congestion at left base. The blood Wassermann test was negative. Ophthalmoscopic examination revealed moderate sclerosis of the retinal vessels but no hæmorrhages or exudate. Electrocardiograms indicated an active pathological lesion in the myocardium, characteristic of recent infarction, and transient bundle-branch block of the common type.

On the fifth day after admission a pericardial friction rub was heard for the first time. During the first two weeks the patient's temperature ranged between 99 and 101°, and then remained normal; pulse between 60 and 110; blood-pressure between 150 to 240, systolic, and 50 to 140, diastolic. Following the initial episode of severe pain he gradually became quite comfortable, but acute spells of dyspnœa with a sense of choking recurred several times a week at first, then, with diminishing frequency. After several months' convalescence he resumed his usual habits. The diagnosis on discharge was arteriosclerotic heart disease, moderate cardiac hypertrophy, coronary thrombosis, pericarditis, transient recurrent bundle-branch block and hypertention. He is now attending the cardiac clinic of the Jewish General Hospital. The attacks of angina pectoris on effort persist. The blood-pressure ranges from 210 to 270, systolic, and 120 to 140, diastolic. Heart sounds are distant and both are reduplicated. While under observation in the cardiac clinic the bundle-branch block became permanently established.

Description of the electrocardiograms.—The first electrocardiogram, taken on November 13, 1934 (Fig. 1), shows normal rhythm; rate of 70; P-R = 0.16 sec.; Q.R.S. = 0.10 sec.; marked left axis-deviation of the type associated with left ventricular hypertrophy, and diphasic T in leads II and III. A record taken on January 10th (Fig. 1), the day after his admission to the hospital, shows sinus arrhythmia; rate 61-73; P-R = 0.16 sec. in leads I and III; 0.18 sec. in lead II; Q.R.S. = 0.10 sec. in leads I and III; 0.06 sec. in lead

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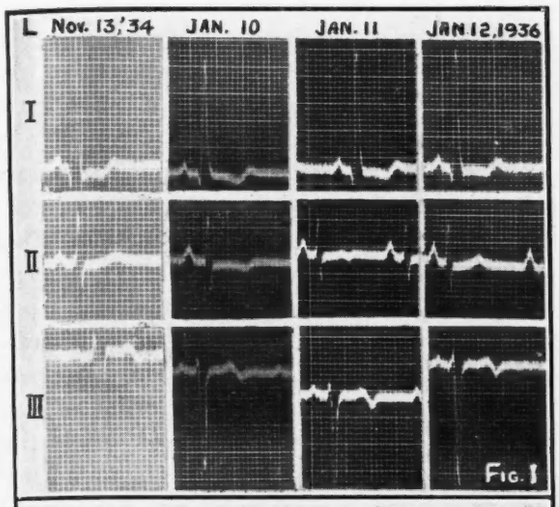
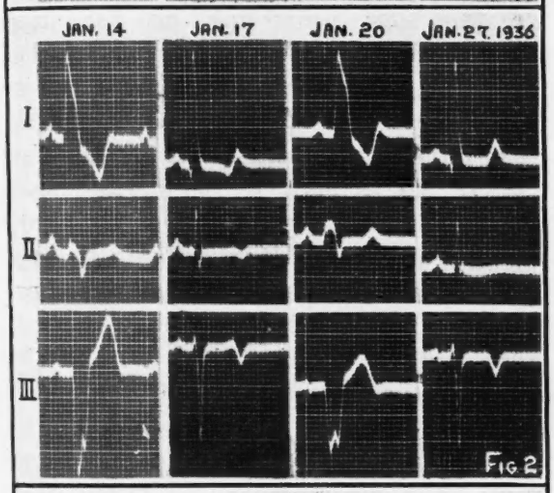
II; S-T interval depressed in leads I and II, elevated in lead III; T diphasic in all leads. The records of January 10th, 11th, and 12th are shown in Fig. 1; daily changes occurred in the configuration of the T waves indicating an active myocardial lesion (infarction following coronary thrombosis). The electrocardiogram of January 14th (Fig. 2) for the first time shows ventricular complexes indicative of bundle-branch block of "common" type. The record of January 15th shows bundle-branch block, but the Q.R.S. complexes are of different configuration. The electrocardiogram of January 17th (Fig. 2) shows reversion to usual conduction, but bundle-branch block reappears with the record of January 20th (Fig. 2), and is also present in record of January 22nd; but on January 27th (Fig. 2) a transition to normal ventricular complexes was again noted, and this persists in the records of January 29th, February 3rd, 7th, 17th, and March 13th (Fig. 3). This last record reveals changes in the amplitude of Q.R.S. complexes and the direction of T waves as compared with previous records of conduction along both branches of the bundle of His. May 29th (Fig. 3), bundle-branch block reappeared, and subsequent records obtained on June 26th (Fig. 3), July 10th (Fig. 3), and July 31, August 7th, and September 11th constantly show ventricular complexes of bundle-branch block, but of a somewhat different configuration from those of previous similar records. This suggests continuous active ventricular myocardial disease affecting arborizations of the conduction system and a permanent block of one branch of the bundle of His.





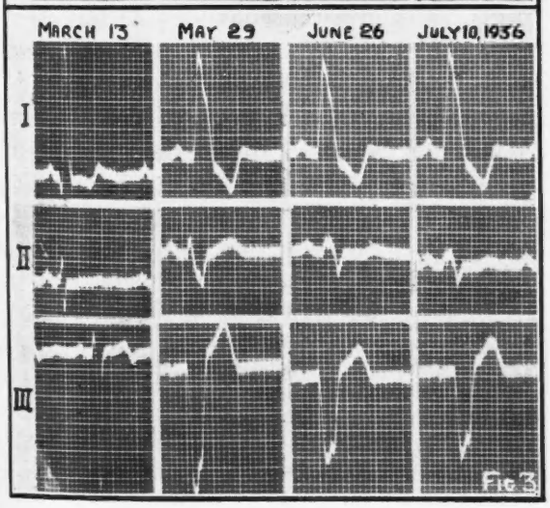


Fig. 1.—Daily changes indicative of active myocardial disease. **Fig. 2.**—Transient and recurrent bundle-branch block of "common" type. **Fig. 3.**—Changes in the configuration of ventricular complexes. Persistence of bundle-branch block of "common" type.

COMMENT

Several theories have been advanced to explain the mechanism of transient bundle-branch block with or without demonstrable structural changes in the heart. Wolff, Parkinson and White[2] have observed paroxysmal bundle-branch block accompanied by shortened P-R interval occurring in otherwise healthy persons who were subject to paroxysmal ventricular tachycardia. They consider this phenomenon functional in character and dependent on vagus influences. Coincident with the release of vagus tone by the administration of atropine or after exercise there is a transition from the ventricular complexes seen in bundle-branch block to normal ones with a prolongation of P-R intervals. This observation was confirmed by Tung[3] who recently reported two cases in one of which ventricular complexes reverted to normal after atropine was given subcutaneously, and in the other the same effect was produced by indirect vagus stimulation. He concludes that functional bundle-branch block of vagus origin is a separate entity independent of organic heart disease. Wolferth and Wood,[4] however, do not subscribe to this view. In their study of nine cases they were unable, by exercise and atropinization, to bring about a return of normal conduction. Their investigation led them to the conclusion that the notched, widened Q.R.S. and short P-R interval cannot be explained on the basis of bundle-branch block. They advance the hypothesis that this mechanism is due to an acceleration of conduction from the auricle to a section

of the ventricle by a conduction wave passing over an accessory conducting pathway, the bundle of Kent. This structure lies between the right auricle and right ventricle in the right lateral border of the heart, but shows variations in localization as well as in degree of conductivity. It is said to function inconstantly. Roberts and Abramson[5] observed that carotid sinus stimulation, atropine, and exercise had no effect on the aberrant ventricular complexes and short P-R interval but that the administration of quinidine resulted in the production of a normal electrocardiogram. Starting with the assumption that the disturbed mechanism in conduction is due to the transmission of impulses along the bundle of Kent, they further assume that this structure, not possessing a highly developed state of conductivity, succumbs to the depressant action of quinidine more readily and the normal channels resume the conduction of impulses. On the other hand, Lewis[6] considers the anatomical and physiological evidence insufficient to support the theory that impulses are carried by the bundle of Kent.

Other observers have emphasized the relationship between the general state of circulation and the occurrence of bundle-branch block. Willius and Keith[7] called attention to cases presenting transient incomplete bundle-branch block coincident with acute pulmonary œdema. Baker[8] found that faulty conduction bore a certain relation to cardiac rate. When the heart-rate was slowed down to 60 by rest and digitalis, normal ventricular complexes occurred; when the rate was accelerated by exercise, abnormal complexes reappeared. After the administration of oxygen improvement of intraventricular conduction occurred even when the cardiac rate was increased by exericse. A similar observation was recorded by Harris and McGuire.[9] In their patients who were previously free from circulatory disturbance cardiac symptoms developed acutely, and were followed in a few hours by bundle-branch block; when pulmonary œdema cleared up and the general circulation was restored the bundle-branch block disappeared. Thus under stress of greater demand myocardial fatigue with disturbed conduction develops.

Robinson,[10, 11] while suggesting that abnormalities in conduction may occur without demonstrable anatomical lesions but purely as a result of functional fatigue, sets forth the theory of a metabolic nutritional disturbance of conduction tissue brought about by the presence of acid metabolites in the ventricular structure and interference with the nutrition of the myocardium due to sclerosis of coronary vessels. Willius and Anderson[12] agree that faulty conduction is the result of nutritional impairment of conduction tissue caused most frequently by coronary artery disease. During temporary restoration of its circulation the heart recovers sufficiently to permit normal conduction. They conclude that transient block may be a manifestation of the gradual development of a permanent disturbance in conduction, the disorder being transient only in its inception. The most important contribution from the point of view of the histopathological study of conduction tissue was made by Mahaim.[13] He found that there are few convincing histopathological studies of human hearts of persons in whom, during life, electrocardiograms were obtained characteristic of bundle-branch block, and that, in many instances, where the conduction tissue was reported as normal, the bundle-branches were not carefluly examined along their entire course. According to Mahaim, pure unilateral bundle-branch block is rare, owing to the common source of blood supply of the right bundle-branch and the anterior division of the left. These structures are supplied by the anterior descending branch of the left coronary artery which is most often involved in the sclerotic process. His investigations lead to the conclusion that disturbances in conduction are always due to interruptive organic lesions of conduction structures. Yater, Cornell, and Claytor,[14] who recently reported three cases of auriculo-ventricular block due to lesions in both bundle-branches, made a detailed histopathological study of conduction tissue. They found coronary arterial sclerosis resulting in fibrous displacement to be the most common cause of bundle-branch lesions. The bundle-branches, being of neuromuscular tissue, are most susceptible to reduction in blood supply and are affected earlier and more profoundly than the myocardium. They believe that serious difficulty in conduction may occur before the bundle or its branches are completely interrupted by organic lesions, and illustrate the point by the second and third cases of their report, both of

which showed disturbance of conduction, although incomplete interruptive fibrosis of bundle-branches was evident on examination. On the other hand, a few remaining healthy strands of conduction tissue may suffice to maintain normal conduction; when these are depressed by toxic, vagus, or nutritional influences, transient disturbance in conduction results; and, finally, when these fibres become involved in the pathological process permanent disturbance in conduction is produced.

As observations in this case are limited to clinical and electrocardiographic data I may only venture to suggest that the cause of transient bundle-branch block was disease of the conduction tissue. Thus following coronary thrombosis one of the branches of the bundle of His (the left, according to Wilson and his associates, or the right according to the older theories) became partially involved in the process of infarction. Eventually fibrosis must have destroyed conduction completely in that portion of the bundle and led to permanent block.

CONCLUSION

Transient bundle-branch block of the common type occurred several times subsequent to coronary thrombosis before this disturbance in conduction became permanently established. The changes in type of intraventricular conduction were not accompanied by any subjective symptoms. Duplication of both heart sounds appeared only in the presence of bundle-branch block. It is most likely that in this case the transient block was due to disease in the neuromuscular conduction tissue and not the result of neurogenic (vagus) influences.

I wish to express my thanks to Dr. Harold N. Segall for valuable assistance in the preparation of this report.

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RUPTURE OF THE MEMBRANES IN RELATION TO LABOUR*

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THIS paper is presented primarily as a review of the various methods of induction of labour, with particular reference to induction by artificial rupture of the membranes at or near term. Spontaneous and artificial rupture of the membranes will be considered in more detail in relation to not only induction but also to the type of labour ensuing. In addition, a modified routine for the induction of labour will be presented; and also, a new instrument designed to rupture the membranes, where the cervix is one or more fingers dilated, in conjunction with vaginal examination.

The problem of acquiring an effective method of inducing labour for some abnormality or complication of pregnancy has long been a matter of more than general interest. Induction of labour has been considered desirable for such conditions as eclamptic or pre-eclamptic toxæmia, chronic nephritis, contracted pelves and disproportion, habitual death of the fetus, cardiovascular disease, prolonged pregnancy, and overgrowth of the child, pulmonary disease, unresponding pyelitis, etc. Various mechanical methods of induction have been advocated. Some of the earliest of these were introduced for the purpose of reflexly stimulating the uterus by pressure and stretching of the upper vagina. This was effected by the use of vaginal packs,

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colpeurynters, etc. Such methods were very uncertain and for that reason unsatisfactory. Then more direct uterine stimulation was attempted, with the addition to the obstetrical armamentarium of a variety of mechanical agents, such as hydrostatic bags, bougies, rectal tubes, etc. Bougies were introduced by Krause[1] in 1855, and the first practical hydrostatic bag or metreurynter was devised by Tarnier[1] in 1862. These methods as a rule require sedatives or anæsthetics prior to their use, and often are associated with discomfort to the patient before labour is initiated. They also have certain disadvantages, such as the possible displacement of the presenting part, and the risk of intrauterine infection. In most instances the methods are very slow, and cannot be depended upon to induce labour invariably. Hydrostatic bags have failed to induce labour in the experience of nearly everybody. Bougies have been introduced, and after waiting what seems an interminable number of hours, the obstetrician has been forced to give oxytocic drugs, or to use other methods to obtain uterine contraction. Experience has shown that there is a definite danger of infection if bougies are left in for a longer period than twenty-four hours. The use of various oxytocic drugs, including ergot, has been advocated from time to time, but they have proved mostly ineffective, besides carrying with them certain disadvantages and dangers.

The method known as medical induction of labour was introduced by B. P. Watson[2] some fifteen years ago. Castor oil, enemata, quinine, and pituitrin were used to initiate labour pains. For a time this procedure was thought to represent an ideal and simple routine method of induction, but various series since then have shown that it was effective in inducing labour, at or near term, in only approximately two-thirds to three-quarters of the cases. Our experience at the Burnside Obstetrical Division of the Toronto General Hospital over a three-year period from October 1, 1933, to October 1, 1936, shows some 85 inductions in which W. A. Scott's[3] modification of the Watson technique was followed. The majority of the patients in whom induction was attempted were at term. A considerable number were from two weeks to a month over the calculated term, and only a few of the cases were premature, and then only by approximately two weeks. Approximately 38 per cent of the inductions failed. An addition to the Watson technique was suggested, which consisted in the freeing of the membranes from the cervix. This gave slightly better results, though it was still far from being a completely reliable method.

Hofbauer and Hoerner,[4] in 1927, suggested the use of nasal pituitrin to replace the hypodermic administration of this extract. In this modification, a gauze pledget soaked with 1 c.c. of pituitary extract is inserted under the inferior turbinate. This method has the advantage of being a controlled administration of pituitrin, though it has not particularly altered the results of the Watson technique.

Induction of labour by rupture of the membranes has been used for almost 150 years, and there is reason to believe that the method is considerably older than this. Denman,[21] in 1793, was one of the earliest recorded of its advocates. The method has been reintroduced many times, and dropped because of the fear of dry labour. This condition almost traditionally has been considered as a cause of prolonged delivery, as well as all manner of attendant difficulties and complications. J. M. Slemons,[5] in 1928, was one of the first to observe the excellent results following artificial rupture of the membranes. He suggested the use of castor oil, enemas, and quinine; if labour did not ensue within six hours the membranes were ruptured. If labour did not then follow within a few hours minim doses of pituitrin were given to initiate it. This method gained the approval of Whitridge Williams[17] and has been reported in his text-book as a reliable and effective method of inducing labour. The literature since then, and especially during the last three or four years, has contained many articles dealing with the induction of labour by artificial rupture of the membranes. Among those reporting on this method are A. F. Guttmacher and R. G. Douglas;[6] D. G. Morton;[7] L. W. Mason;[8] L. Wilson;[9] D. L. Jackson;[10] G. FitzGibbon;[11] E. L. King;[12] E. N. Blair;[13] E. D. Plass and C. W. Seibert;[14] and L. C. Spademan.[15] These writers have commented upon the simplicity and effectiveness of this method, and have noted the relative safety to the mother and child, providing certain principles are followed, in comparison with other methods of induction.

Various instruments have been used to rupture the membranes. The following are some of those which have been suggested: tenaculum, uterine dressing forceps, Allis forceps, Kocher forceps, a hook similar to one blade of a disarticulated vulsellum tenaculum, orange stick, trochar, scissors, not to mention the use of the sharpened finger nail before the days of sterilized rubber gloves, or the thimble hook, since then. Where the cervix is undilated dilatation has to be accomplished by various mechanical methods prior to rupture of membranes. This usually necessitates sedatives or anæsthesia.

PHYSIOLOGICAL CONSIDERATIONS

Before proceeding to a discussion of the relation of spontaneous or artificial rupture of the membranes to labour, it might be of value to comment upon some aspects of the physiology of the subject.

Function of the liquor amnii.—Undoubtedly the most important function of the amniotic fluid is to serve as a water-cushion protecting the fetus against trauma. It also permits fetal movement, and aids in preventing faulty development as well as the formation of adhesions between fetal parts or to the membranes. Scanty

fluid usually accompanies fetal amputations or where bands of amniotic adhesions interfere with the normal development of some fetal part. Undue pressure on the umbilical cord by the fetus is prevented. According to C. C. Norris[16] the fetal temperature is stabilized by the amniotic fluid.

Function of the membranes.—The fetal membranes are only a few mm. in thickness, and are composed of a chorionic and amnionic layer with a thin layer of connective tissue between. They seal the amniotic fluid within the limits of a gradually expanding cavity, and offer considerable protection against bacterial invasion of the uterine cavity from the endocervix. It is undoubtedly true that the membranes and fluid are essential to normal gestation, but it is altogether likely that their function is over at the onset of labour. The membranes normally rupture at the end of the first stage of labour or during the second. Rupture prior to or after the onset is sufficiently common in pregnancies where a normal presentation and position exist to make it questionable whether this occurrence should be regarded as an abnormality or even as a complication to ensuing labour. The amount of fluid escaping depends upon three factors: (1) the amount present; (2) the type of fetal presentation and position, and (3) the point of rupture. In spontaneous ruptures the loss of fluid may vary from a few c.c. to amounts approximating the entire content. As a rule the latter occurs only where abnormal presentations, maldevelopment of the fetus, disproportion, etc., exist. More frequently one observes the escape of fluid in relatively small amounts, coinciding with fetal movement, maternal activity, or labour pains.

The cause of the onset of labour.—After considering the many reflex, neuromuscular, mechanical, biochemical and endocrine theories as to the cause of onset of labour, one is inclined to agree with G. FitzGibbon[11] that increasing pressure of the presenting part against the supravaginal cervix and adjacent parametrium is a determining factor. Normally, the enlarging fetus toward term causes increasing pressure in the lower uterine segment in three ways: (1) by reason of its own increasing weight and that of the associated amniotic fluid; (2) by limitation of upward and outward growth through pressure against the diaphragm and abdominal wall, and (3) by intermittently increased uterine contractions, as described originally by Braxton Hicks, which represent the exaggerated normal contractility of unstriped uterine muscular fibres. To correlate this theory with the results of modern endocrine investigation, instead of assuming reflex neuromuscular mechanical stimulation of the uterine muscle let us add the following. The increasing pressure involving the lower uterine segment and parametrial tissues may, through the sympathetic nervous system, stimulate the posterior lobe of the pituitary body. This liberates pituitrin, which in turn acts upon an œstrin-activated musculature of the uterus, to initiate and maintain labour. If the membranes rupture the consequent reduction in uterine volume enables the muscular fibres to retract, and this results in more forceful contractions, thus causing increased intrauterine pressure. In addition, pressure occurs directly against the internal os when the integrity of the lower pole of the membranes is destroyed.

The mechanism of cervical dilatation.—According to Whitridge Williams the dilatation of the cervix should be regarded as consisting of two stages—(1) obliteration of the cervical canal, and (2) dilatation of the external os. The obliteration of the canal occurs from above downward, the beginning being indicated by a funnel-shaped depression at the internal os, which gradually increases in extent and depth until the entire uterine canal has disappeared, and the uterine cavity is then separated from the vagina merely by the external os. Then the dilatation of the external os commences. Formerly these changes in the cervix have been felt to be entirely due to the function of the bag of waters, but more recently the view is gaining ground that dilatation of the cervix is an intrinsic function of the uterine musculature as a whole. G. P. Shears[18] stated that the longitudinal muscle fibres of the uterus are inserted into the circular fibres of the internal os, and by their upward and outward pull effect dilatation of the cervix, so that the latter is drawn up over the presenting part, and not the presenting part pushed through the cervix. This mechanism, with which E. L. King[12] agrees, converts the cervix into a downward extension of the lower uterine segment. This intrinsic uterine function accounts for the fact that it is common to find one to

two fingers of dilatation in the cervix prior to the onset of labour. This is likely due to the intermittent uterine contractions of Braxton Hicks, which are accentuated near term.

RUPTURE OF THE MEMBRANES IN RELATION TO ENSUING LABOUR

Spontaneous rupture of the membranes prior to or at the onset of labour.—The membranes may rupture at any time during the latter months of pregnancy, though rupture prior to the end of the eighth month is not common. Various causes have been suggested. Certain observers have stated that the predisposing cause of rupture before or at the onset of labour lies in the condition of the membranes themselves. Trauma, disease, degeneration, or maldevelopment of the membranes may result in a thinness or friability with lack of tensile strength. Pre-eclamptic toxæmia and syphilis appear to be associated not infrequently with early rupture. Increased uterine pressure, where twins, large fetuses, monstrosities, hydramnios, etc., exist, may also be a factor. Where the presenting part is not engaged, due to disproportion, malpresentation or malposition, contracted pelves, etc., unduly strong Braxton Hicks contractions may cause pressure to be transmitted directly to the membranes over the internal os, with resultant rupture.

In a study of 5,968 cases delivered Ballard[19] found 425, or 7.12 per cent, presenting spontaneous rupture of the membranes before the onset of labour. In her opinion parity and age had no effect upon the frequency of rupture. The labour ensuing in these cases was observed to be shorter in duration than the average for the remainder of the series, and operative deliveries were not increased in frequency. There was no maternal mortality, and morbidity was negligible. The average latent period (time elapsing between the rupturing of the membranes and the onset of labour) in primiparæ was 13.17 hours; in multiparæ 21.41 hours. Norris[16] reported the average duration of labour in 106 cases of spontaneous delivery following spontaneous premature rupture of the membranes to be 11½ hours. In 180 cases of spontaneous premature rupture the interval between the rupture and onset of labour in two-thirds of the cases was within six hours. M. Schulze[24] found, in an analysis of 600 cases where the membranes had ruptured before or with the onset of labour, that more than one-half of the cases went into labour within the first hour and over one-third immediately. Less than 10 per cent showed a latent period of more than 24 hours, and in these more than two-thirds were premature. She also noted that the average duration of the first stage of labour in both primiparæ and multiparæ was markedly shorter than that given by Whitridge Williams.[17] In 82 per cent of the ensuing labours the change was strong and effective. In this series she found that labours prolonged over 24 hours were less frequent than have been reported in unselected series. In a high proportion of prolonged labours, following spontaneous rupture of the membranes she found one or more additional factors which might have contributed to the prolongation, and in more than two-thirds of the cases requiring operative interference she found one or more causes for dystocia, apart from dry labour.

A number of authors ascribe many difficulties, disadvantages, and dangers to the labours which follow rupture of the membranes with drainage of the amniotic fluid, such as prolonged labour with long and painful dilatation of the cervix, increased percentage of operative interference, increased danger to the child, prolapse of the cord, œdema of the cervix, laceration, infection, etc. G. L. Brodhead[26] states that in the absence of other abnormal conditions the labours following spontaneous rupture of the membranes prior to, at the onset, or early in labour, should be attended by no harmful results to mother or child. F. A. Dorman and E. C. Lyons[27] in 270 cases where the membranes had ruptured twelve hours or more before the onset of labour found that the duration of labour did not appear to be unfavourably affected, nor was the risk to mother or child increased.

Mason,[8] in his series of approximately 1,000 cases delivered at or near term, found 166 cases where the membranes had ruptured spontaneously before or with the onset of the pains. He found spontaneous rupture to be more common in young primiparæ and in old multiparæ, corroborating the findings of R. Bassett.[23] Ensuing labour was on the average 9.5 hours for primiparæ and 6.9 hours for multiparæ. The premature rupture of the membranes in this series had no demonstrable affect upon the maternal mortality or morbidity or the fetal mortality.

Mason also found that in the other cases where membranes remained intact until after the cervix was dilated labour averaged 17.7 hours for primiparæ and 12 hours for multiparæ. Labours lasting over 24 hours were five times as frequent in cases where membranes remained intact as in those in which rupture occurred before or at the onset of labour. In this connection Norris[16] states that where the presenting part fits closely, or where the membranes are firmly adherent, labour is usually protracted. It would appear that where rupture is normally delayed until late in the first, or until the second stage, labour is longer in comparison with that observed in cases in which early rupture has taken place. J. Kreis[25] found in many cases, some without osseous dystocia and some with slightly contracted pelves, that there was no engagement of the head, apparently because of excessive amounts of forewaters and insufficient effacement of the cervix. In most cases engagement followed the rupture of the membranes, with consequent speedy labour. He states that, "the forewaters, so important to cervical dilatation in theory, are in fact seldom present, and when they are present may well be considered at times to cause dystocia".

These foregoing reports offer proof for the statement made earlier in this paper, that it is entirely likely that the function of the amniotic fluid and membranes concludes with the onset of labour. Rupture of the membranes and loss of amniotic fluid in part, or occasionally completely, would not appear to be a deterrent to normal labour. The duration of labour is reported to be as short, and more often shorter in the cases where rupture occurs prior to or at the onset of labour than where the membranes remain intact. Difficulties and complications would appear to be less frequent, or at least not increased in frequency as a result of spontaneous rupture.

Now let us review a number of reports dealing with the induction of labour by artificial rupture of the membranes, and note the relation of this procedure to the ensuing labour.

Artificial rupture of the membranes before the onset of labour.—The observations of Guttmacher and Douglas,[6] Morton,[7], Wilson,[9], Jackson,[10] Plass and Seibert,[14] and others, consistently indicate the efficacy of artificial rupture of the membranes in inducing labour, and they note the relative safety to the mother and child. Where certain principles are followed in deciding upon cases suitable for this procedure these observers are agreed that ensuing labours are distinctly shortened in duration, and that operative interference and difficult labours are not increased; and also that there is no increase in maternal mortality or morbidity or in fetal mortality. There is almost a general agreement that rupture of the membranes should not be undertaken where definite disproportion, contracted pelvis, or abnormal presentation exist, or where there is a distinct possibility of operative interference, or in any case where a floating head is present. There is, however, an exception to the rules laid down. Where the indication for induction is imperative, rupture of the membranes may be performed in cases where the head is not engaged, but only where it is felt that the latter during labour will not be obstructed in its advance through the pelvis. In such cases there is an increased risk to the child because of the danger of prolapsed cord; but if the risk to the mother and child is greater through delay in initiating labour induction may be justifiably undertaken by rupture of the membranes. Plass and Seibert[14] ruptured the membranes in 335 cases where the head was unengaged and found prolapsed cords in five. Eastman, in discussing their paper, quoted 303 cases in which rupture of the membranes had been employed to induce labour. In these engagement of the head was present prior to the use of this method, and only one prolapsed cord resulted. Consequently it has been advised that, as a general rule, this method should be limited to vertex presentations showing engagement of the head.

The use of castor oil and quinine prior to the rupture of the membranes, with, if necessary, the addition of pituitary extract in small doses following rupture, as originally suggested by J. M. Slemons,[5] has many advocates, though there are some like FitzGibbon[11] who employ no preliminary medication. In his cases this observer found labour to be faster following artificial rupture than spontaneous, though his series is small. Guttmacher and Douglas[6] found that castor oil and quinine given prior to rupture of the membranes shortened the time before the onset of labour. The addition of the Hofbauer[4] method of nasal administration of

pituitrin following the rupture of the membranes did not materially shorten the latent period. In their series of 120 cases in which rupture of the membranes was used they found the average latent period to be less than four hours in 102 cases, and over 4 hours in the remaining 18. It had no relation to the amount of fluid lost, to the period of pregnancy, or to the size of the child. The latent period was especially short where the cervix was found to be partially dilated prior to the rupture of the membranes. If the cervix was long and undilated both the latent period and labour tended to be prolonged. They further noted that both stages of labour were distinctly shortened in primiparæ and in multiparæ, the average duration being 10.15 hours in the former and 5.43 hours in the latter, as compared with a series in which the membranes remained intact—17.59 hours in primiparæ and 11.75 hours in multiparæ. There was no increase in operative interference, maternal mortality or morbidity, or fetal mortality. Morton,[7] using castor oil and quinine preceding rupture of the membranes and intranasal pituitrin following in 150 cases, found the latent period to average less than two hours for both primiparæ and multiparæ. He reported the average duration of labour as 9.65 hours for the former and 3.93 hours for the latter. This was well below the average for labours of spontaneous onset over the same two-year period.

The report of Plass and Seibert[14] is most instructive, and further upsets the dogmatic statements made up until recent years with reference to so-called "dry labour". These observers analyzed 681 cases in which rupture of the membranes was employed as a complement to induction of labour with castor oil and quinine, with or without the addition of pituitary extract following rupture. In 335 cases the head was unengaged, and in another 300 the head was fixed but above the level of the ischial spines, the remainder being at a lower level than the pelves. In approximately 89 per cent the latent period was less than six hours. Labour terminated spontaneously in 94.3 per cent, and was completed within twelve hours by primiparæ and within six hours by multiparæ in approximately two-thirds of the cases. In addition, the cervix was found to be thick and uneffaced in 633 out of the 681. In view of the fact that most obstetricians feel that artificial rupture of the membranes should not be attempted in the absence of engagement of the head the report of these observers is somewhat iconoclastic. It further serves to illustrate how little apparent value must be attached to the bag of waters as a cervical dilating agent, and as a requisite to normal progress in labour.

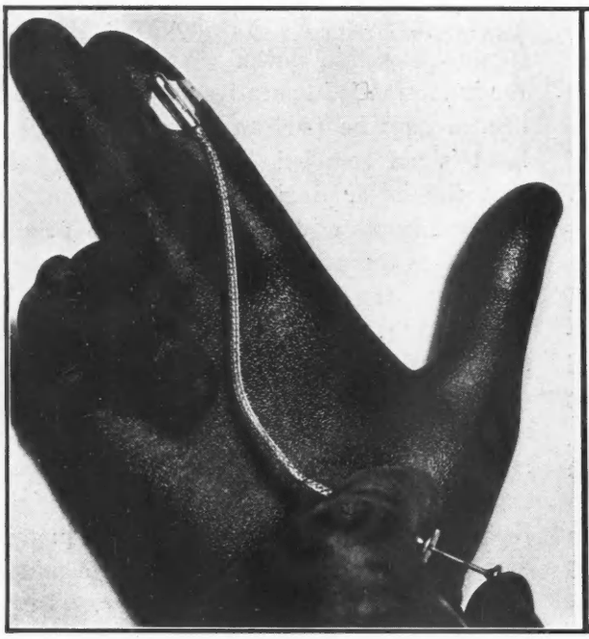

Fig. 1.—Shows membranotome in position to rupture the membranes.

Fig. 2.—With hook projected to catch and incise the membranes.

Wilson[9] suggests the release of 250 to 500 c.c. of amniotic fluid at the time of rupture of the membranes, though the quantity of fluid escaping has no relation to the length of the latent period, in his opinion. In 84 per cent of this rather small series delivery was effected within 10 hours, the great majority having rather short labours. Jackson,[10] in reporting his findings in a series of 500 cases of artificial rupture of the membranes, is in general agreement as to the shortening of labour by this method of induction, and the apparent absence of risk to the mother and child. He advises allowing all the fluid that can readily be released to be encouraged to escape. He further advises against large doses of pituitrin after rupture of the membranes, and suggests patience, especially in cases where elongated non-effaced cervices are present. He regards a high-presenting part as unfavourable, because of the difficulty in judging possible disproportion and because of the increased risk of prolapse of the cord.

Eastman, in discussing the report of Plass and Seibert,[14] advises against large doses of quinine as a preliminary medication to rupture of the membranes. He feels that a 30-grain, or even a 20-grain, dose of quinine may prove harmful to the fetus. He points to the experimental work of Schübel who showed that large doses of quinine paralyze the uterus, whereas small doses stimulate it. Doses of 3 to 4 grains would appear to be safer and just as effective in stimulating the uterus prior to rupture of the membranes.

Artificial rupture of the membranes after the onset of labour.—The artificial rupture of the membranes, providing the head is engaged, either in the first or second stage of labour, according to many observers does not prolong labour but rather expedites it. A. G. King[22] reported a series of 200 cases of deliberate rupture of the membranes in the early first stage of labour in normal vertex cases. He compared these with 100 cases of spontaneous rupture at the onset of labour, and also with 200 cases proceeding normally, with the membranes rupturing at the usual time in labour. The labours following artificial rupture were shortened by about one-third; the percentage of cases subjected to interference was less; there was less maternal morbidity, and no mortality was evident either in mother or child; whereas one still-birth occurred in the spontaneous rupture group and two in the cases proceeding normally with intact membranes. E. L. King[12] feels that the difficulties so often credited to a dry labour are due to other complicating abnormal conditions, and that rupture of the membranes before or at the onset of labour is a result, rather than a cause, of difficulty in labour. This is in agreement with the opinions of M. Schulze.[24] L. C. Spademan,[15] in an analysis of 1,000 consecutive deliveries, presents 266 cases where artificial rupture was employed; in the remainder the membranes ruptured of their own accord. He found that artificial rupture, either in the first or second stage, did not prolong labour, nor did it increase the frequency of operative deliveries in either multiparæ or primiparæ. Maternal mortality and morbidity, and fetal morbidity were not increased.

Whittridge Williams[17] feels that dense or adherent membranes after complete dilatation of the cervix may retard birth, and it may be advisable to rupture them artificially. W. Stroganoff,[20] in a recent study, reports the effect of early rupture of the membranes in treatment of 86 cases of eclampsia. He found delivery to be accelerated, with increased uterine contractions, and fewer convulsions, instead of more, as he expected.

From personal observations in cases where the head is fixed at any level in the pelvis I cannot recall any interference with the progress of labour due to artificial rupture of the membranes. I believe that labour is actually expedited, and that both stages of labour may be considerably shortened. This is especially true in multiparæ.

A Routine Method of Induction of Labour

In view of a number of observations contained in the foregoing reports the following modified routine of induction of labour is suggested. It is understood that this method is to be employed only where definite indications for induction exist, and in accordance with the principles stated.

6.00 a.m.—Castor oil, 1½ oz.
10.00 a.m.—Soapsuds enemata, until the return is clear.
11.00 a.m.—Quinine hydrochloride, grs. iii.
1.00 p.m.—Quinine hydrochloride, grs. iii. If no pains are evident by
5.00 p.m.—The membranes are ruptured, and if labour has not been initiated by the following morning then at
8.00 a.m.—Pituitrin, intramuscularly, 1 minim. If no effect at
8.15 a.m.—Pituitrin, 3 minims. This may be repeated every half hour for six doses unless labour intervenes, when nothing further is given. In many instances pituitrin will not be necessary.

The membranotome.—This is a simple instrument which I have designed for the purpose of artificially rupturing the membranes in conjunction with aseptic vaginal examination before the onset of or during labour. Its use is not applicable in cases where thick and undilated cervices exist. Rupture of the membranes is readily effected in cases where the cervix is soft, thinned, and dilated to one finger or more. The membranotome consists of a small projectable hook, mounted on a split ring capable of fitting any sized finger. The hook may be extended at will, the force being conveyed through

a flexible metallic tubing, after the principle of a camera shutter release. This instrument may be sterilized by boiling or by the autoclave. It is worn over sterilized gloves and placed about one-half to one inch from the tip of the index or middle finger, with the hook on the palmar surface of the latter. Vaginal examination may be conducted as usual, to determine position of the head, and the degree of cervical dilatation, etc. If one wishes to rupture the membranes the hook is projected to catch and incise the membranes and then it is allowed to retract. The small point of rupture should be enlarged with the tip of the finger, and the membranes freed from the cervix. Then by intermittently pressing up on the head small amounts of amniotic fluids are allowed to escape. The hook is designed so that it is practically impossible to damage the cervix or the scalp of the child. The instrument was made in accordance with my submitted design, by the J. F. Hartz Co., Toronto.

CONCLUSIONS

Artificial rupture of the membranes in vertex presentations where the head is engaged is an effective and safe method of inducing labour.

The latent period is usually shortened by preliminary medication with castor oil and quinine.

Spontaneous or artificial rupture of the membranes is not followed by the disadvantages formerly attributed to dry labour; but, rather, it would appear to actually expedite labour; and is not a cause of increased frequency of operative delivery, nor of increase in maternal mortality and morbidity, and fetal mortality.

The theory that the bag of waters is necessary for cervical dilatation in labour should be discarded; instead, cervical dilatation should be regarded as an intrinsic function of uterine muscle, relatively independent of a possible pushing action of the presenting part.

SUMMARY

A review of reports from the literature has been presented, dealing with spontaneous and artificial rupture of the membranes and the relation of this procedure to the ensuing labour.

A routine for the induction of labour is suggested.

A new and simple instrument is described for the artificial rupture of the membranes in conjunction with vaginal examination prior to the onset of or during labour, where at least one finger dilatation of the cervix is present.

The extensive bibliography prepared in connection with this paper may be had on application to the author. The small numbers in the text refer to the papers noted.

A COMPARATIVE STUDY OF THREE SURGICAL MASKS*

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ON the occasion of the Congrès de l'Association des Médecins de Langue Française de l'Amérique du Nord which assembled in August, 1934, a paper was introduced entitled "Presentation of a new surgical mask".[1] This came as a result of four years' research work on a surgical germ-proof mask, in other words, a mask preventing the escape of any germs coming from the operator's breathing. We availed ourselves of the highly reputed technique of Dr. Irving J. Walker, of Boston,[2] in making these analyses, and now take the liberty of quoting the words of this eminent surgeon, who, when speaking to a meeting of the College of American Surgeons, October 14, 1929, is quoted as follows.

> "Although we have devoted much time and effort to its discovery, we regret that we are not in a position to give you the ideal mask; we do however, submit a mask that we trust you will consider and analyze, in the hope that it may stimulate a greater interest in the study of the infection of surgical wounds . . . . and we hope ultimately the perfect mask will be discovered."

The opinion of such a well-informed authority encouraged us to continue our experiments which had already been started, and, to put these analyses to the test, we used "Ascitic (fluid) bacto agar medium". Petri dishes were placed in front of the operator, in that particular instance, a lecturer. The *modus operandi*

* From the Clinical Laboratory of Hotel-Dieu Hospital, Montreal.

has already been described in vol. I, no. 1, of the *Bulletin de l'Association des Médecins de Langue Française*. Since it would be pointless to repeat at this juncture all our methods we shall confine ourselves to the statement that the comparative readings of the various Petri dishes enabled us to establish the fact that the "Jel" mask gave an almost perfect return; in other words, it eliminated constantly and regularly 95 to 99 per cent of the germs exhaled by the reader. We have therefore come to the conclusion that the "Jel" mask, consisting of a cardboard protector with its filter of absorbent cotton pellets served as the perfect mask from the viewpoint of protection for the patient, at the same time being less hot for the surgeon than the masks now being used.

Two years later, Mr. Armand Frappier, Head of the St. Luke Hospital Laboratory and his assistant, Mr. Lionel Forté, took up the same study and the five months taken up by their research ended by their reaching practically the same conclusions. The findings of Messrs. Frappier and Forté were published in this *Journal*.[3] Mr. Forté presented his memorandum at a meeting of the Biological Society of the University of Montreal, and the discussion centered on the methods used in the two instances. *Quot capita tot sensus.* Each one propounded his theory, and finally it was suggested to try fresh experiments in a closed room, to eliminate certain sources of error in the bacterial calculations, in particular, readings without a mask, which would give too great a number of bacteria.

Fig. 1.—The Mephisto or Canadian mask—two layers of gauze. After five hours of reading, this mask allowed the escape of 443 bacteria. **Fig. 2.**—The American mask—eight layers of gauze. After five hours of reading, this mask allowed the escape of 57 bacteria. **Fig. 3.**—The "Jel" mask—combination of gauze and filter. After five hours of reading, this mask allowed the escape of 7 bacteria. **Fig. 4.**—The metallic chamber in which experiments were conducted.

Although we were quite convinced of the intrinsic merits of the "Jel" mask, we acted on the suggestion of Dr. Gosselin, and we had a tiny metal-construction room built, 2½ feet wide, 3 feet high, and 3 feet long. This little room was supplied at the top with a window to permit the passage of light, and with 12 air-tubes sealed by 2 reinforced gauze bands with an opening to accommodate the head of the person experimenting. To avoid dampness and to prevent the germs from adhering to the walls we placed a dish containing calcium chloride inside. After having satisfactorily disinfected our room, we began our experiments by placing 4 Petri dishes inside for one hour's reading. The forenoon preceeding the experiment a count of the bacteria in the air of the room was made with the help of the 4 Petri dishes, as for the main experiment. Our experiments were made by comparing three masks "The Mephisto", an American mask, and "Jel". The following tables show statistical comparisons.

On reading these three tables we can submit with assurance that after 5 hours of reading in full voice the masks under trial allowed a very varying amount of germs to escape. We should note that the temperatures taken inside the room during our experiments ranged between 75 and 80° F.—the regular temperature found in operation rooms.

CANADIAN MASK (MEPHISTO)

Date		*R*	*L*	*C*	*F-E*	*Total*
1-4-36	air	2	4	3	5	14
" "	M	18	24	20	17	79
7-4-36	air	5	3	1	2	11
" "	M	27	28	31	53	139
9-4-36	air	4	5	2	3	14
" "	M	22	25	19	34	100
14-4-36	air	5	3	4	3	15
" "	M	25	23	22	29	99
15-4-36	air	3	4	5	4	16
" "	M	19	24	23	30	96

After five hours of reading, this mask allowed the escape of: Mephisto: { Mask. 513 / Air... 70 }

443 Bacteria 443

R—Petri dish, right side of the operator.
L—Petri dish, left side of the operator.
C—Petri dish, centre of the box.
F-E—Petri dish, far-end of the box.
Air—Air in the box, before experiment.
M—Air in the box, during experiment.

AMERICAN MASK

Date		*R*	*L*	*C*	*F-E*	*Total*
10-2-36	air	2	2	3	1	8
" "	M	3	4	4	2	13
14-2-36	air	3	1	5	1	10
" "	M	4	3	8	3	18
3-3-36	air	4	3	5	1	13
" "	M	5	7	6	8	26
12-3-36	air	5	7	5	2	19
" "	M	10	11	9	12	42
13-3-36	air	2	2	2	1	7
" "	M	5	2	5	3	15

After five hours of reading, this mask allowed the escape of: American: { Mask. 114 / Air... 57 }

57 Bacteria 57

"JEL" MASK

Date		*R*	*L*	*C*	*F-E*	*Total*
4-3-36	air	5	7	4	4	20
" "	M	5	7	1	3	16
23-3-36	air	1	3	2	2	8
" "	M	1	4	4	2	11
6-4-36	air	4	3	3	1	11
" "	M	4	4	4	2	14
11-4-36	air	4	2	3	1	10
" "	M	3	3	3	2	11
13-4-36	air	3	4	5	3	15
" "	M	5	7	5	2	19

After five hours of reading, this mask allowed the escape of: "Jel": { Mask.. 71 / Air.... 64 }

7 Bacteria 7

Here, with our new technique, it is not a question of percentage, but of plain matter-of-fact figures. We believe that these figures speak for themselves and that it is not necessary to add a long dissertation on the intrinsic merits of the "Jel" mask. We close by repeating what we said in Quebec (*loc. cit.*) in August, 1934.

"As in such matters, the best ought not to be dissociated from the good; and every conscientious surgeon would wish the best, above all, when he is convinced that an ordinary mask, made of gauze stretched in front of the mouth, is but an illusory protection for the patient when it is dry, and becomes a potential danger for the person undergoing the operation when it is moist with saliva and the operator has to speak."

With the full realization of these facts it is the surgeon's duty to act.

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LIGHTING AS A MORE EXACT SCIENCE*

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ARTIFICIAL lighting for seeing has been, up to a few years ago, almost entirely empirical. Accurate measurement of light was needed to place it on a scientific basis. Apparatus for this purpose was cumbersome and difficult. Gradually, however, during the past twenty years more exact information has been obtained, but only with the advent of a convenient and reasonably accurate photometer in 1931 did progress towards a real science of lighting become rapid. This light meter not only made laboratory experimentation easier, but it made possible the application of the principles already learned, to everyday conditions. For that reason Wilmer included the photometer among the outstanding advances in ophthalmology since 1925. Research has been carried out by many agencies—physicists, physiologists, ophthalmologists, psychologists, lighting companies, and health departments. The outstanding contributions have been from the laboratory workers of the large lighting companies and from a few physiologists. The problem has resolved itself into answers to a few questions—what is the proper intensity, quality and distribution of light for the best perception of the work in hand, and for the maximum of eye comfort? What is best for continued eye health, and for the least bodily fatigue?

Intensity of lighting for visibility only, varies very widely. The eye has developed under daylight conditions which range from several hundred to about 10,000 foot candles, yet it can do moderately fine work such as reading under ½ a foot candle. When work is done under lighting which approaches the lower threshold of visibility even healthy eyes complain. And the necessary forcing of the convergence and accommodation, with the accompanying contraction of the pupil, not only causes "eye strain" but also, eventually, eye deformities, and even eye diseases.

The light on a shaded verandah on a fine day is about 500 foot candles, and we read quite comfortably under it. The light in many reading rooms is not more than three foot candles, yet the healthy eye does not complain much about it. Many experiments, however, have shown that best work is not being done at this lower intensity. Between certain intensities of illumination rapidity and accuracy of work increases as the light is increased. A British Government investigation found that at 20 foot candles the output in type-setting reached its maximum. Daylight conditions did not increase its speed. The Washington Public Health Bureau ran a series of experiments in the Chicago post offices on work done in sorting mail under different illuminations. They found that as the light was increased from 2¼ foot candles to 9 the output of mail sorted per man per hour increased from 28 to 33 lbs. per hour. In various factories it has been proved that an increase of the usual fair lighting caused the output to jump considerably. For instance, in a plant making infant's hosiery in Philadelphia, doubling the lighting intensity and eliminating glare and sharp shadows raised production at once on the knitting machines 10.6 per cent, and on the looping machines 10.1 per cent. In a ladies' hosiery factory a three months' test showed a 14 per cent increase in the production for the day shift and a 16 per cent for the night shift under illumination which had been increased from 7.2 foot candles to 16.5 of diffuse light. Tests run in school classes showed that increase in illumination raised the marks obtained by the classes very considerably. And when the children who were doing better work under improved lighting conditions changed rooms with classes of the same grade who were not doing so well, the relative scholastic achievements of these classes were reversed. In fact, abundant proof has been brought forward that an increase from what has been considered good lighting to better lighting increases human accomplishment when it has to do with eye work.

* A paper read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Ottawa, Section of Ophthalmology, June 24, 1937.

These somewhat rough and ready investigations have been corroborated by exact experimentation and ingenious apparatus. Their results have been highly consistent in regard to visual acuity for reading. From a fraction of a candle power to 5 candle power the rise in acuity is very rapid, from 5 to 10 it is much slower, and above 10 it increases very slowly to 20. After 20 it is almost stationary.

Intensity for comfortable reading of good book print by normal eyes is about 6 foot candles, and for ordinary newspaper type about 13 foot candles. Old eyes or poor eyes require greater intensities. In fact, judging by the size of the pupil alone a man of 80 years needs four times the illumination that a man of twenty-five does.

Other considerations in addition to intensity play a great part in comfortable reading. These are *quality of light* and *quality of lighting*. As regards quality of light, the nearer it approaches in its spectrum to that of daylight the better. The quality of lighting includes brightness, and the distribution of brightness contrast. And the brightness does not concern only the source of light but also the brightness of the object observed, and the brightness contrast between things to be observed and their background.

In reading we are dealing with relatively black ink and relatively white paper. Contrast would seem to be fairly constant, but it is by no means so. The average book paper reflects about 80 per cent of the incident light, while the paper of the average telephone directory reflects only 57 per cent. The print in the telephone book also has a different absorptive percentage, and usually a different size. The final result of the various factors is that it takes about three times the illumination to exhibit the details of a telephone directory with equal distinctness to those of a well printed book. Intensity of illumination, brightness of the object itself or its background, and contrast, are all bound up together. Without illumination you cannot see, but without brightness and contrast you cannot see much either. You cannot easily see a black thread on black velvet even with great intensity of light; it is only because they are not absolutely black that you can see them at all. There must be brightness contrast. This of course is everyday knowledge, but the measurement of the factors concerned is new.

But even plenty of light thrown on good white paper which has good black print on it does not meet all requirements for reading. There must not be too much brightness contrast between the work and the surrounding room.

Tests made on tasks when the eyes looked up frequently from the critical work before it to other objects in the room showed that 12 per cent more work could be done when there was no brightness contrast between the task and the rest of the room as when the contrast was 100 to 1. Not much difference was found when the brightness contrast was as 10 to 1. This interference with rapid vision is due to the varying size of the pupil and the necessity for repeated retinal readaptation. On the other hand, it was found that if the general brightness was greater than the brightness of the printed page the rate of work was slowed up. This suggests that relative higher stimulation of the rods and cones in the periphery of the retina depresses the activity of the cones in the fovea. Probably also some glare is produced. Glare is the "bad boy" of the lighting problem. It may be simple or veiling. Simple glare is too great brightness in any part of the field of vision. Veiling glare, which concerns the central field of vision, is an obscuring of the vision on the retina, produced either by an overlay of scattered light or by unfocused light reflected from the work surface. The former is due to the diffusing or scattering properties of the lens and other refracting media of the eye, and the latter, to specular reflection from the light itself. The discomfort from simple glare is probably due to the contraction of the pupil. The discomfort from veiling glare is due to reduction of visibility and the consequent effort of all the muscles concerned to clear up the image. Experimentation to show the reduction of visibility due to glare in general demonstrated that when the glare source, a 100 watt lamp giving 5 foot candles on the test object, was 40° above the horizontal the effective intensity of the illumination was reduced 46 per cent. When it was 5° above the horizontal the intensity decreased 84 per cent.

As regards the health of the eyes and lighting, it has been difficult to be very "scientific" in the approach to this phase of the problem. It is, of course, well known that work in the semi-darkness produces severe eye conditions, *e.g.*, miner's nystagmus. Also, even in one's own practice, more cases of myopia, for instance, seem to come out of old poorly lighted offices than from modern well lighted ones. But other factors, such as ventilation, age, type of work, complicate the conclusions. Perhaps the most suggestive statistics yet compiled are those of the Washington Public Health Department in the New York Post Office. They compared the eye conditions of 2,449 employees, divided about equally between the old, poorly lighted City Hall post office and the more modern, better lighted offices of the city, with the following results.

	City Hall	*General*
Normal vision in both eyes with no defects	10.3	19.8
Defective vision in both eyes	42.5	32.6
Refractive errors	76.6	72.5
Inflammatory conditions	20.9	11.9
Muscular imbalance	33.4	22.4
Asthenopia	16.5	5.7

The average difference in illumination was that of 3 to 5 foot candles. These statistics are, of course, open to many errors, but the results are consistent enough to be suggestive.

The above investigations suggest that for good perception for reading, for comfort and for health of the eyes, about 10 foot candles of well diffused light should be provided for normal eyes. In addition to the required amount of light on the central field there should be a peripheral lighting of about 3 foot candles. The lighting engineers, however, are not satisfied with this intensity. They say that even though the eye does not complain and a high working speed is maintained, and even though the eyes may remain healthy over a period of years, unnecessary energy is expended in the seeing effort under these illuminations.

Lukiesh and Moss, working in the General Electric laboratories, tried to prove this contention. They measured in grams the pressure changes in muscular tension in the finger tips while normal subjects read large (12 point) type under 1, 10, and 100 foot candles of light. The mean pressures were found to be 63.2 grams for 1 foot candle, and 54.1 grams for 10 foot candles. They concluded, therefore, that even for such a task which could be done rapidly with an illumination of 1 foot candle, 100 foot candles should be used.

Tinker, of the Department of Psychology of the University of Minnesota, says this experiment does not warrant the conclusions. Lukiesh and Moss plotted their findings on a logarithmic scale when they should have been plotted on a linear scale. When revised on this basis the results show marked changes up to 5 to 6 foot candles, gradual changes from 6 to 10, very small changes from 11 to 25, and practically no significant changes thereafter. In fact, the revised curve is very similar to the curve expressing the relation between visual acuity and illumination intensities. Workers in Cleveland also claim to have established that the pulse rate decreases perceptibly (4 per cent) when the light is increased from 1 to 100 foot candles.

The present ideas on lighting for reading show some agreement on what is good lighting, but considerable range in what is considered the very best. A summary leaning towards conservatism is as follows.

1. Light for reading ordinary print should be about 10 foot candles.

2. For poor print or print on paper that is not a good white 20 foot candles should be used.

3. The light should be diffused.

4. If a diffuse light is not available the intensity should be lower, about 6 foot candles, to avoid glare.

5. There should be supplementary lighting of the central field, to make it greater than the peripheral lighting.

6. No bare lights should be visible in the peripheral field.

7. Old eyes or poor eyes need more light.

These, however, are only general rules. It has become apparent that eyes have considerable variation in their requirements of light, and, even otherwise apparently normal eyes, react differently. It has also, of course, been recognized from the first that different tasks require different intensities of light. The result has been the advocating of light prescription for each individual case. Ferres and Rand, particularly, have been insistent on this point. They not only test their patients for their optimum range of lighting requirements

for different tasks but are now providing specially constructed lamps which allow the patient to vary his own lighting within this range in accordance with the work he is asking his eyes to do. The General Electric Company also have a lamp. But they have also a visibility meter which decides the amount of light required for different tasks.

My own experience in the last 18 months has impressed me with the practical results which can be obtained by following the suggestions coming from these workers. A dozen or more patients who complained of burning of their eyes or headaches have been relieved of their symptoms by changing the lighting conditions under which they were working. In the majority it has been merely a matter of increasing the intensity of the light to 10 foot candles or over. (It is surprising to find that many offices have not more than 3 foot candles of light on the workers' desks.) In two cases a change from work on coloured cards to ordinary typing has produced the desired result. Two others were relieved by removing them from artificial light to daylight, during daylight hours. Two more were relieved by desk lamps in addition to the ceiling light. The ceiling light gave more than 10 foot candles on their desks, but they were apparently suffering from improper brightness contrast.

There is, of course, nothing new in our appreciation of the deleterious effects of too little light, glare, poor print, poor paper, etc., on our eyes. Ophthalmologists have inveighed against poor lighting long before our time. The general public have demanded and obtained much better conditions for their eyes. Compare the books of a past age with those of today. But the mass of careful investigation on a basis of exact measurements has given us all a solid foundation for old, recognized truths about lighting, and has added a considerable number of new truths. Thanks to the investigators in this field we can now speak with much more authority than we could a few short years ago. And we can get cooperation from all concerned as we could never have obtained at any previous time.

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TWO COMMON COMPLICATIONS OF EAR INFECTIONS*

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THE complications commonly found in ear and mastoid infections are meningitis, thrombosis of the lateral sinus, brain abscess and labyrinthitis. The purpose of this paper is to discuss meningitis and brain abscess and to outline a few of the more important points in diagnosis.

Meningitis in an adult is frequently secondary to ear or accessory sinus infections. Why this is not impressed on the profession at large is a mystery. Every student should be given the axiom, that in any case of meningeal irritation the ear should be eliminated first as the primary focus. If this were done fewer cases would be admitted in a moribund state, with a "full-blown" meningitis or definite extension from the otic region found at post-mortem.

MENINGITIS

Types.—Meningitis, or more properly leptomeningitis, may be serous or purulent, localized or diffuse, and may run an acute or chronic course. When it is the result of an extension from the ear the otic suppuration may be acute or chronic. The extension may be by an erosion of the tegmen above, the lateral sinus groove,

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the posterior or anterior surface of the petrous tip, or, more rarely, through the roof of the middle ear. In the absence of bony defects it may pass through the internal ear and the internal auditory meatus, by sheaths of vessels communicating between the middle ear and meninges, or along the vestigeal vessels persisting to the subarcuate fossa. The perilabyrinthine fluid is in direct communication with the cerebrospinal fluid, and a purulent labyrinthitis gives an accessible direct pathway.

Pathology. — The type of organism has a direct bearing on the reaction that is developed. Usually there will be a central collection of pus containing the organism. This is followed by a zone of necrotic tissue showing fewer organisms with dead and living polymorphonuclears. Next is found an area of many living polymorphonuclears with no organisms, and a peripheral zone of proliferating connective-tissue cells, plasma cells and lymphocytes.

The meningeal coverings of the brain are very resistant, and you may have your classification of types limited according to the extension of these zones. (1) The organisms may not have overcome the resistance of the meninges but the peripheral layers of the reaction have. This would result in an extradural abscess and a serous meningitis. (2) The organisms and the purulent zone finally reach the subarachnoid space, and, due to the free communication of the cerebrospinal fluid, one can see that every potentiality is present for a diffuse spreading meningitis. Occasionally the purulent process localizes, and a local purulent meningitis results, even after having organisms in the spinal fluid.

Meningeal infections due to the influenza organism tend to localize, as do also those of pneumococcus type I. We have recently had a *B. Proteus* infection at the Toronto General Hospital that localized and the patient lived. But the usual outcome of infections after the subarachnoid space is reached is death. It is needless to point out the necessity of immediate mastoid operation in all cases showing meningeal signs, for it may only be necessary to expose and drain an extradural collection of pus. The meningeal signs are frequently due only to the reactionary zone with no organisms within the protecting coverings.

Spinal fluid.—Spinal fluid differs in constituents from blood because of the filtering action of the choroid plexus. Chlorides, magnesium, glucose, etc., pass through but proteins do not. This is important in irritation or infection, when the filtering power is altered and thus also the constituents of the spinal fluid. The glucose in the presence of bacteria, with their putrefactive action, tends to disappear. The inorganic salts are more stable, and even when the cell-count is up considerably the salts may be normal in amount. The importance of this is that when these organic salts are definitely reduced, as estimated by the amount of chlorides, the presence of an extensive diffuse infection is indicated. Greenfield[1] believes that the estimation of the chlorides, next to finding the organism, is the most important diagnostic point in differentiating a local from a diffuse meningitis.

Symptoms.—Diffuse serous meningitis differs only from the purulent type in the severity of the symptoms and in the evidence found in the spinal fluid. The onset is the same and frequently only a stage in the progressive development of the full-blown disease.

Diffuse purulent meningitis. — Jenkins[2] attempted to divide the onset into two types. The division was made as to whether the development was from a labyrinthitis or by direct extension without the involvement of the labyrinth. In the labyrinthine type the onset is slow, with torpidity rather than the irritability usually present. The headache is diffuse and bilateral with the temperature never elevated above 101°. The type with a preceding localized dural irritation begins with deep pain, localized to one side or to the back of the neck. Marked signs of irritability are present with restlessness and frequent vomiting. The temperature is high and always over 101°. The differentiation does not seem important, except that one should bear in mind the two possible types of onset. The one all-important symptom is persistent, deep-seated headache that has no periods of relief. The patient who is not doing well, either before or after operation, who has persistent headache, has meningeal involvement either within or outside the dura. Along with this is resistence to flexion of the head. When these two symptoms are found before operation, invariably will some exposure of dura be found with what could be termed then an extradural abscess.

True rigidity of the neck with opisthotonos comes later, along with Kernig's and Brudzinski's signs. It is very difficult to judge how far the patient could normally extend his leg with the thigh flexed, so that Kernig's sign should not be necessary for a definite early diagnosis. There are a few allied signs due to the increased irritability of the whole central nervous system, including the Babinski reaction, hyperactive reflexes or even convulsions. These, along with the typical position of the patient, lying on his side with knees drawn up and eyes turned from the light, are manifestations of well established disease that we do not want to see. The terminal delirium cries, muttering, high temperature (even to 108°), pulse changes, from full and bounding to fast and thready, contracted pupils with ocular palsies and choked discs are end-processes that lead to final paralysis and the coma that precedes death. If we are to help the patient we must base our diagnosis on persistent headache, cervical resistence, slight mental change, with a definite infection of the ear. These should call for a spinal puncture and the preparations be made for immediate operation. Lumbar puncture is not a dangerous procedure and can readily be performed by any one. The evidence looked for is, increase in pressure, elevation of cell count, changes in chemical constituents, and the presence of organisms on smear or culture.

Pressure can be estimated in terms of mm. of water, *i.e.*, the number of millimetres the fluid is raised in a tube in a vertical direction. In adults a pressure over 175 is definitely abnormal, while in children it may be normally higher than this and much more so in the event of crying. Changes in jugular compression will not be discussed here. A case is still favourable in spite of marked increase in pressure if the cell-count is not over two hundred. This is especially true if the cells are not mostly polymorphonuclears. A normal fluid should not contain more than two cells and these lymphocytes. Many patients do recover with a remarkably high count when no organisms are found.

Globulin, as tested by the Ross Jones or Pandy tests, is always present with any irritation, and is of little diagnostic help. Glucose is readily reduced in the fluid, but if markedly so this usually means organisms present, with their putrefactive action, in the subarachnoid space. As mentioned before, chlorides are more stable and reduction of these means a diffuse infective or purulent process, either established or soon to be so.

Organisms should be looked for on both direct smear and culture. Pneumococcus, unless cultured on chocolate agar, does not grow readily, but the characteristic encapsulated organisms can easily be demonstrated with a simple Gram or methylene blue stain, in a direct smear. Smears made of the residue after centrifuging the fluid are important if positive rather than if negative, in view of the time factor in obtaining growth.

Recognizing the few simple symptoms above and doing a spinal puncture may entirely change one's attitude to an ear case. Operation will be performed immediately, and a thorough mastoidectomy done with adequate exposure of the dura. Usually an extradural collection of pus will be drained that may mean the difference between recovery or a diffuse meningitis with death.

PROGNOSIS AND TREATMENT OF DIFFUSE MENINGITIS

Diffuse meningitis ends fatally in the great majority of cases. The prognosis in children under 5 and adults over 40 is especially bad. According to Turner[3] meningitis due to chronic suppurative otitis media is less favourable than that due to the acute form, while meningitis following labyrinthitis is of specially bad omen. Further, in cases associated with sinus thrombosis the prognosis is better than in those with brain abscess.

The treatments tried have been many. Repeated lumbar puncture, cistern puncture with irrigation, carotid injection with various drugs, and incision of the dura with drainage have all been tried. Most can be done for the cases due to organisms for which specific serums are available, namely, *pneumococcus I, B. influenzæ,* and *meningococcus.* Although occasional recoveries under various treatments of cases due to pneumococcus III and streptococcus have been reported they are very rare. Unfortunately these are the two organisms more frequently found in virulent ear and mastoid infections.

BRAIN ABSCESS

Etiology.—Brain abscess of otitic origin may be divided according to its origin into three

types: (1) from direct extension from adjacent structures; (2) from retrograde thrombosis of cerebral vessels leading directly into the brain substance; (3) metastatic. These three types of origin afford an explanation for the types of abscess found. The type with a stalk is from direct extension, with no apparent external connection, probably thrombophlebitic in origin, and that in the opposite side of the brain or the frontal region is of metastatic type.

Symptomatology.—Although the early symptoms may be very vague the whole course can be divided clinically into four stages as follows: (1) initial; (2) latent; (3) manifest; (4) terminal.

The initial stage is supposed to correspond with the pathological red softening in the brain substance in early extension. The patient has an otitic infection. There may be an initial chill that is indefinite, headache, nausea with vomiting, accompanied by a slight rise in temperature. This may last for only part of a day or perhaps two. There is usually cessation or diminution in the amount of discharge preceding this period.

The latent stage may be widely variable in time and symptoms. Headache may be the only persistent symptom, although keen mental coordination is lessened.

The manifest stage manifests symptoms of: (*a*) cerebral compression; (*b*) toxæmia; (*c*) localization.

The compression symptoms consist of headache, vomiting, slow pulse, a rise in pulse pressure, changes in the respiratory rhythm, subnormal temperature, optic neuritis, ocular palsies and spinal fluid changes. Headache is constantly present, aching in type, and varying in intensity with changes in œdema of the brain substance. Vomiting is of the projectile type and not preceded by nausea. It is not related to ingestion of food or any other definable cause. The temperature may have periods of elevation but at times it is subnormal. Accompanying active ear infection or lateral sinus thrombosis, etc., may alter this. The blood pressure changes are not so important in brain abscess as in tumour. Respiratory rhythm is interfered with when compression is well developed, and a Cheyne-Stokes' type of respiration, either in its true form or somewhat simulated, is found. Optic neuritis may be slight or marked, and is not proportional to the size of the abscess or the time it has been present, but rather to its position in relation to obstruction of the normal circulation of the spinal fluid. The spinal fluid changes in a chronic, deeply seated abscess may be very slight. The increase in pressure can be estimated by the manometer only and not by the rate of flow. Signs of a serous meningitis will also be present and the cellular reaction proportional to this local meningitis either at the site of origin of the abscess or on its approach towards the brain surface.

Toxæmia is usually present with an active abscess. The patient does not look well, becomes emaciated, with furred tongue, is constipated; the appetite is poor, except in rare cases where it may be ravenous. The patient sleeps a great deal but is always restless.

The discussion of localizing symptoms is confined to temporal sphenoidal abscess of adjacent type and cerebellar abscess. Metastatic abscess may be found in any area of the brain from otitic infection, so that if localization seems to point to the frontal or occipital lobe, or to the contralateral side, this must be borne in mind. Eagleton[4] points out that metastatic abscess is embolic in origin so that one has a sudden appearance of symptoms with usually a history of some sort of apoplectic attack. Accompanying signs of thrombi are usually found elsewhere.

DIAGNOSIS

In diagnosis one or more of the several symptoms mentioned above may lead one to suspect abscess. There is ear or mastoid suppuration, and operation may give some clue as to possible localization. Perisinus abscess, lateral sinus thrombosis, or even an unhealthy appearance of the sinus is a lead to the diagnosis of cerebellar abscess, as in an extradural collection of pus in the middle fossa area of the roof of the mastoid or middle ear to the temporo-sphenoidal.

Temporo-sphenoidal abscess.—Localizing symptoms.

1. Primary focus of infection — situation in the tegmen.
2. Directly localizing.
   - (*a*) aphasia—sensory, sound memory type;
   - (*b*) word deafness;
   - (*c*) quadrant hemianopsia—transient or fixed;
   - (*d*) facial paralysis of opposite side — lower facial;
   - (*e*) contralateral hemiparesis, or even hemiplegia (legs affected first).
3. Symptoms directly related to localization.
   - (*a*) pain in teeth and eye } Gasserian ganglion;
   - (*b*) pain behind the ear }

(*c*) convulsion—localizing value in tumours is great (50 per cent); in abscess it occurs infrequently;
(*d*) dreamy state of the patient;
(*e*) psychic manifestations of toxic delirium;
(*f*) uncinate gyrus symptoms—parosmia rarely;
(*g*) past pointing (very rare) association tracts;
(*h*) x-ray pictures; ventriculograms show frequently distortions of ventricles.

Cerebellar abscess.—Classification of symptoms.

1. Manifestations of impaired cerebellar function.
   (*a*) asynergia or incoordination of homolateral side, as illustrated by adiadokokinesis;
   (*b*) homolateral cerebellar paresis — *i.e.*, pyramidal decussation;
   (*c*) cerebellar attitude—*i.e.*, the patient stands on wide base, is more comfortable lying down, lies curled up with head turned to the side of the lesion and when upright inclines his head to this side also. Yawning may be marked and speech may be scanning type, as in disseminated sclerosis;
   (*d*) cerebellar ataxia — late in appearance frequently. Has three parts—muscular asthenia, m. ataxia, and m. atrasia;
   (*e*) hypermetria—failure of inhibition after the point where the muscular act should be completed, *e.g.*, touching the nose with the hand or heel to knee.
2. Manifestations of involvement of cerebellar portion of vestibular tract.
   (*a*) spontaneous or
   (*b*) induced abnormalities of (1) nystagmus, (2) vertigo, (3) past pointing, and (4) falling.
3. Manifestations of direct pressure.
   (*a*) cranial nerve symptoms of 9th, 10th, 11th, 12th;
   (*b*) sensory tract symptoms;
   (*c*) motor tract symptoms (mentioned before under pyramidal paresis);
   (*d*) sympathetic symptoms—dilatation of homolateral pupil (irritation only).
4. Manifestations of internal hydrocephalus because of position in cerebrospinal fluid system. A comparison of these shows considerable difference in the two locations. Most of these are self explanatory, but to enlarge slightly on them we shall take temporo-sphenoidal first, followed by the cerebellar type.

Temporo-sphenoidal.—The aphasia is a dissociation of the visual auditory tracts, and the patient recognizes objects and their use but cannot name them. A number of tests should be made, for only a certain percentage of the common objects may be missed in the test. In right-handed persons this centre is on the left side, and vice versa with left-handed patients. Word-deafness is not so definite because it is probably bilateral, and is tested by asking the patient to perform some act. For example, if you hand him a book, paper and pencil and tell him to read aloud he may write down what he reads and not read out loud at all.

The quadrant hemianopsia may be small and increased for colour. It may be transient in nature when due to œdema only. Extension to the posterior horn of the internal capsule region is the cause, and, because of its comparative frequency, the visual fields should always be checked.

If facial paralysis is present it is only a partial lower facial because it is a supranuclear lesion and the upper face has a bilateral origin.

Cerebellar.—One of the chief points one wishes in differential diagnosis is to be assured that the symptoms are not labyrinthine in origin rather than from the cerebellum. The most important consideration is whether the patient hears with his affected ear. If there is marked reduction of bone conduction or no hearing with the Barany noise apparatus in the good ear there is probably a diffuse labyrinthitis. Many of the other signs are not very reliable, but are summarized by Eagleton[5] under nystagmus, vertigo, past-pointing and constancy of symptoms.

Nystagmus.—In a cerebellar lesion this is to the side of the lesion but may vary from time to time, even to complete absence. The labyrinthine type is always away from the lesion, has a combined rotary and horizontal component and is much finer.

Vertigo.—The cerebellar patient tends to fall backwards and is not influenced by changes in position of the head or by cold water in the aural canal.

Past-pointing.—In a cerebellar lesion this is outward on the side of the lesion. Syringing the good ear will give you past-pointing of the hand on that side outward, but still outward on the diseased side. One might also emphasize the constancy of labyrinthine symptoms with usually their rapid development simultaneously. In cerebellar abscess it is only the repeated examination and recording of symptoms with their marked variance of appearance and disappearance at irregular intervals that are important in the early stages. The cerebellum is one of the lowest of our sense organs in specialization, and compensation is easily attained in slowly developing abscess.

Terminal stages.—These cases may terminate by coma and death from medullary failure. The largest number develop a diffuse meningitis either from the approach of the abscess to the brain surface or by rupture into the ventricle.

CONCLUSIONS

Meningitis and brain abscess have been discussed from the otologist's viewpoint. A great deal of the discussion may seem to belong more to the field of neurology but these cases are the result of ear infection, and the danger signals must be recognized.

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INSULIN AND VITAMIN A.—M. Roller has been able to prove that there is an antagonism between vitamin A and insulin. A greater consumption of vitamin A increases the glycosuria in diabetes. This explains the decreased sensitiveness to insulin following a fat-albuminous diet which is rich in vitamin A and the increased response after a carbohydrate diet which is poor in vitamin A. According to the author, the increased sugar tolerance in hypothyroidism is due to an insufficient conversion of carotin into vitamin A, and he cites a number of clinical observations confirming his thesis.—*Med. Klinik*, May 14, 1937, p. 661. Abs. in *Brit. M. J.*

IRRADIATION THERAPY OF CANCER OF THE BREAST

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STIMULATED by the encouraging reports of Cade and Keynes,[1] of London, on radium therapy in cancer of the breast, and discouraged by the results of surgical methods as shown by statistics, our Cancer Diagnostic and Treatment Group decided to employ irradiation in a series of cases of cancer of the breast. The cases, 130 in number, were grouped similarly to the Steinthal method, *e.g.*

Group I.—A lump in the breast, without lymph nodes.

Group II.—A lump, with palpable nodes in axilla.

Group III.—(*a*) A lump in the breast, with nodes in the axilla and supraclavicular areas. (*b*) A lump adherent to the skin or chest wall. (*c*) A lump, with distant metastasis.

Group IV.—A post-operative recurrent group.

The charts shown, however, cover only a little more than a three-year period, and are to be considered only as a preliminary report. We feel, however, the results are encouraging enough to deserve recording, and they have stimulated the Clinic to continue this method of treatment.

TECHNIQUE

The patient receives pre-operative preparation. The skin is swabbed with metaphen. We do not use any iodine preparation, as the skin tends to produce blebs or local infection at the needle punctures. A general anæsthetic is given.

The needles contain radium chloride, platinum filtration, and are of low radium content. Filtration varies from 0.6 mm. of radium in the 1.3 mg. containers to 1 mm. in the 1.5 needles. The needles remain interstitially five to nine days without producing necrosis. Thus we get an equal intensity of irradiation with a small quantity of radium over an extended time, as advocated by Professor Rigaud.

The method of treatment is to irradiate not only the tumour but the lymph nodes or nests draining the breast. By this method better results can be attained than are possible by the Halstead operation. Cade dubbed this method "the radium Halstead".

Experience will guide the operator as to where it will be necessary to insert the needles to intensify the irradiation. The history of the patient is important, as well as the age of the patient, the rapidity of the growth, the quadrant of the breast in which the mass is located, and the size and distribution of the lymph nodes. A mass located in either the upper or lower outer quadrant of the breast requires more intensive irradiation of the axillary fold and pectoral area than if located in the inner quadrant. The inner quadrant requires that particular attention be given to the substernal lymphatics and the infra- and supraclavicular gland areas. However, all lymphatic areas must be irradiated, regardless of the location of the tumour mass.

INTRODUCTION OF THE NEEDLES

Breast.—Needles of 60 mm. length, containing 3 mg. of radium, of 0.8 mm. platinum filtration, are inserted beneath the lump, in a parallel row, 1.5 cm. apart. For masses in the breasts thicker than 5 cm. a second row of 2-mg. needles, 33 mm. in length, filtration of 0.65 mm. platinum, is placed into the mass, 2 cm. anterior to the deeper row, at 2 cm. distance.

The axilla.—Platinum-filtered 2-mg. needles are placed into the anterior and posterior axillary folds, parallel to the skin, and also deep into the axilla at right angles and along the ribs, 2 cm. apart. Irradiate all the axillary lymph gland area. There is no danger of piercing an artery if needles are inserted carefully and without undue force. Two rows of 2-mg. needles are placed, one row beneath and one between the pectoral muscles, at 2 cm. distance.

Clavicle.—Platinum needles of 1 mg., 27.7 mm. length, 0.8 mm. filtration, are inserted end to end, both below and above the length of the clavicle.

Neck.—Needles of 1.3 mg., 0.6 mm. platinum filtration, are inserted into the triangles of the neck and along the sternomastoid muscles.

Sternum.—Finally, 1.5 mg. needles, 1 mm. platinum filtration, 33 mm. length, are inserted in the intercostal spaces so as to partly overlie the sternum. The total number of needles is 50 or more, totalling 90 to 110 mg. The needles

are left in place for seven days, making a total dosage of 12,000 to 15,000 mg. hours.

The needles are threaded with Sta-brite flexible wire, twisted and cut to four-inch lengths. The free ends of the wires are passed through perforated lead shot, following insertion of the needles. The shot is compressed and extra wire cut. This eliminates worry about the possibility of the loss of a needle, which may occur when waxed thread is used. In most cases the needles are sufficiently sharp to pierce the skin without skin incision. The needles must be inserted beyond the eye, into the subcutaneous tissue, or local skin necrosis may result. The needles are removed under gas and oxygen anæsthesia.

The patient returns in a month or six weeks following the radium treatment, when a radium pack is applied. The wax pack is composed of beeswax, paraffin and sawdust (called a Columbian wax pack) 1 cm. thick. The wax is warmed and moulded to fit the breast, axilla, and the supraclavicular and sternal regions. Needles of 2 mg. each are placed at 2 cm. distance in parallel rows, and so distributed as to intensely irradiate the tumour and lymphatic areas, as formerly when the interstitial treatment was administered.

TABLE I.

Classification A

First 130 cases of cancer of the breast admitted to the Regina Cancer Clinic

Group I.—(35) Cases with only one mass in breast—no glands

Irradiation		*Irradiation then Surgery*	*Surgery then irradiation*	*Biopsy*	*Disappearance primary mass*	*Appearance of metastases after admission*	*Site of metastases*	*Admitted*			*Deaths after treatment*
Radium	*X-ray*							*1 yr. ago*	*2 yr. ago*	*3 yr. ago*	
x	x	..	H	B	....	....	....	..	..	x	....
..	Prr	..	..	PB	....	....	....	..	..	x	....
x	..	H	..	B	....	....	....	..	..	x	....
x	x	R	..	B	....	....	....	..	..	x	....
Prr	x	..	..	B	....	....	....	..	..	x	....
Ppr	..	R	..	PB	....	....	....	..	..	x	....
x	x	..	..	..	....	4 mos.	ribs & liver	..	..	x	....
x	x	..	..	B	7 mos.	13 mos.	spine	..	..	x	15 mos.
x	..	..	S	..	....	....	....	..	..	x	9 mos.
x	..	..	..	B	....	....	....	..	..	x	21 mos.
x	x	..	..	B	....	....	....	..	x	..	....
x	x	..	..	..	....	....	....	..	x	..	....
x	..	..	..	..	14 mos.	....	....	..	x	..	....
x	..	..	..	B	3 mos.	....	....	..	x	..	....
x	..	..	..	..	5 mos.	....	....	..	x	..	....
x	..	..	..	..	6 mos.	....	....	..	x	..	....
x	..	..	..	..	....	....	....	..	x	..	....
x	..	..	..	..	7 mos.	....	....	..	x	..	....
..	x	..	..	B	....	2 mos.	mandible	x	..	..	....
x	x	..	..	B	....	....	....	x	..	..	....
x	x	..	R	B	....	....	....	x	..	..	....
x	..	..	..	B	2 mos.	....	....	x	..	..	....
x	..	..	..	..	....	....	....	x	..	..	....
..	Ppr	..	..	..	....	....	....	x	..	..	....
x	..	..	..	B	3 mos.	....	....	x	..	..	....
x	..	..	..	B	2 mos.	....	....	x	..	..	....
x	..	..	R	..	....	....	....	x	..	..	....
x	..	..	..	..	6 mos.	....	....	x	..	..	....
x	..	..	R	B	....	....	....	x	..	..	....
x	..	..	..	..	....	....	....	x	..	..	....
x	..	..	..	B	2 mos.	....	....	x	..	..	....
x	..	..	..	B	....	6 mos.	liver & pleura	x	..	..	....
x	..	R	..	B	....	....	....	x	..	..	....
..	Ppr	..	..	..	....	....	....	x	..	..	....
x	..	..	R	B	....	....	....	x	..	..	....
31	13	4	6	21	11	4	4	17	8	10	3

Explanation of abbreviations.—Ppr—previous partial removal; Prr—previous radical removal; B—biopsy at Cl; PB—biopsy done previously; S—surgical removal, simple growth; R—simple removal of the breast; H—surgical Halstead.

The treatment is given for 180 hours, being applied 16 hours daily. The total dosage is again 12,000 to 15,000 mg. hours, making a total irradiation of 24,000 to 30,000 mg. hours, by the combined interstitial and pack method. If four months after the treatment any of the mass remains, a simple mastectomy is advised. This is followed by deep x-ray, for good measure. In many cases the mass disappears before four months, as noted in the Table.

The pathologist, reporting on biopsies of breast tumours removed at the end of four months, found either: (1) no cancer cells; (2) the area replaced by fibrous tissue; (3) non-active cancer cells; (4) deeply-nested active cancer cells in dense fibrous tissue. Only in cases where the lump was dense and of large size, and where only one row of needles was employed, were actively growing cells found spreading into the tissue.

GENERAL AND LOCAL EFFECTS DURING RADIUM TREATMENT

The patient occasionally complains of some pain for the first twenty-four hours. This is easily controlled by sedatives. The temperature

TABLE II.

Classification B

Group II.—(43) Cases with primary mass in breast and glands in the axilla (all metastases at admission)

Irradiation		*Irradiation then Surg.*	*Surgery then Irradiation*	*Biopsy*	*Surgery only*	*Disappearance primary mass*	*Disappearance of glands*	*Appearance of metastases after admission*	*Site of metastases*	*Admitted*			*Deaths after treatment*
Radium	*X-ray*									*1 yr. ago*	*2 yr. ago*	*3 yr. ago*	
x	..	..	R	B	..	....	....	....	....	..	..	x	....
x	x	..	..	B	..	3 mos.	6 mos.	....	....	..	..	x	....
x	..	R	..	..	..	....	....	3 yrs.	skin	..	..	x	....
x	..	..	R	..	..	....	....	....	....	..	..	x	....
x	..	..	..	..	..	....	....	....	....	..	..	x	....
x	..	R	..	B	..	....	....	....	....	..	..	x	....
x	x	..	..	..	..	....	....	....	....	..	..	x	....
Prr	..	..	..	..	..	....	4 mos.	....	....	..	..	x	....
x	..	..	..	..	..	6 mos.	3 mos.	....	....	..	..	x	....
x	..	..	..	..	..	14 mos.	14 mos.	....	....	..	..	x	....
x	x	..	R	B	..	2 mos.	2 mos.	6 mos.	axillary glands	..	..	x	27 mos.
x	x	..	H	B	..	1 mo.	1 mo.	18 mos.	spine	..	..	x	24 mos.
x	x	..	..	..	..	9 mos.	....	24 mos.	general	..	..	x	24 mos.
x	..	..	..	B	..	4 mos.	....	....	....	..	..	x	15 mos.
x	x	..	..	..	..	5 mos.	5 mos.	6 mos.	pelvis	..	..	x	24 mos.
x	x	..	..	..	..	....	....	12 mos.	abdominal & rectum	..	..	x	21 mos.
x	x	..	..	B	..	5 mos.	3 mos.	7 mos.	lungs	..	x	..	....
x	..	..	..	..	..	6 mos.	2 mos.	....	....	..	x	..	....
x	x	..	..	..	..	5 mos.	....	....	....	..	x	..	....
x	x	..	..	..	..	3 mos.	3 mos.	....	....	..	x	..	....
..	..	..	..	B	R	....	....	17 mos.	spine	..	x	..	....
Ppr	..	..	..	PB	..	....	5 mos.	....	....	..	x	..	....
..	x	..	..	..	..	....	....	....	....	..	x	..	....
x	..	..	R	B	..	....	....	....	....	..	x	..	....
x	..	R	..	B	..	....	....	14 mos.	lungs	..	x	..	....
x	x	..	..	B	..	6 mos.	....	15 mos.	pelvis	..	x	..	....
x	..	..	H	B	..	....	....	....	....	..	x	..	....
..	x	..	R	PB	..	4 mos.	....	....	....	..	x	..	....
x	x	..	..	B	..	....	....	5 mos.	spine	..	x	..	11 mos.
..	x	..	R	B	..	....	....	....	....	x	..	..	....
x	x	..	H	B	..	....	....	....	....	x	..	..	....
x	..	..	..	B	..	....	....	....	....	x	..	..	....
x	x	..	..	B	..	2 mos.	....	....	....	x	..	..	....
x	x	..	..	..	..	2 mos.	....	....	....	x	..	..	....
Ppr	..	..	..	..	..	....	....	....	....	x	..	..	....
x	x	S	..	B	..	....	....	....	....	x	..	..	....
x	..	..	..	..	..	5 mos.	10 mos.	....	....	x	..	..	....
Ppr	..	..	..	..	..	....	....	....	....	x	..	..	....
x	x	..	..	B	..	....	....	....	....	x	..	..	....
x	..	..	..	..	..	9 mos.	....	....	....	x	..	..	....
x	x	..	..	..	..	1 mo.	....	1 mo.	spine	x	..	..	4 mos.
x	..	..	..	..	..	5 mos.	5 mos.	....	....	x	..	..	7 mos.
x	..	..	..	..	..	....	....	3 mos.	lungs	x	..	..	5 mos.
39	21	4	9	21	1	20	13	13	13	14	13	16	10

may rise 1 to 1½ degrees; the pulse, in proportion. The blood picture is the same as for x-radiation; nausea or vomiting is not common. Local radium reaction seldom gives any discomfort that cannot be controlled by applying a mixture of castor oil and zinc oxide. The breast shows some œdema before the needles are removed, and this may remain for some months. Fibrotic changes occur but the breast remains of normal shape. Telangiectasia may appear in three months to three years. More often the skin of the breast and the axillary glands are normal. The tumour mass often recedes before the application of the pack. If the breast tumour remains after four months we advise a simple mastectomy, being careful to coapt the suture line without tension. A radical operation is discouraged, as we often find after irradiation that the breast circulation is impaired to such an extent that primary union, following a surgical Halstead, is not likely and a large slough may result, due to arterial sclerosis and tissue fibrosis. Biopsies of tissue, following simple breast removal, are often negative for living cancer cells, and these when found are either dormant or deeply encysted in fibrous tissue.

LOCAL RESULTS

Advantages.—There have been 4 skin recurrences in the radium-treated series—1 in Group II and 3 in Group III. Ulcerated skin lesions heal or become fibrosed. The breast remains of normal shape, but often somewhat of a firmer texture. Normal movements of the arm cause little, if any, pain. There is seldom swelling of arm (1 in the radium-treated series). There is no mutilating operation.

Disadvantages.—Some shortening and thickening of the pectoral fold occurred in 3 cases where intensive irradiation was deemed imperative. Swelling of the arm has occurred in one case (this one was accompanied by metastasis in the opposite breast). Telangiectasis occurs in some cases. A longer stay in hospital is required, totalling three to four weeks.

TABLE III.

Classification C

Group III.—(27) Cases with mass in breast, ulcerated; glands in axilla and other metastases

Irradiation		*Irradiation then Surg.*	*Surgery then irradiation*	*Biopsy*	*Surgery only*	*Disappearance primary mass*	*Disappearance of glands*	*Appearance of metastases after admission*	*Site of metastases*	*Admitted*			*Deaths after treatment*
Radium	*X-ray*									*1 yr. ago*	*2 yr. ago*	*3 yr. ago*	
x	..	..	..	..	..	10 mos.	....	3 yrs.	skin	..	..	x	....
x	x	..	..	..	..	....	....	....	....	..	..	x	15 mos.
x	..	..	..	..	..	....	....	4 mos.	lymph.	..	..	x	4 mos.
Ppr	x	..	..	B	..	....	....	6 mos.	chest & skin	..	..	x	32 mos.
..	x	..	R	..	..	1 mo.	....	12 mos.	lungs	..	..	x	42 mos.
..	x	..	..	..	..	....	....	17 mos.	chest	..	..	x	29 mos.
x	..	..	..	..	..	5 mos.	5 mos.	....	....	..	x	..	....
x	x	..	..	..	..	....	....	....	....	..	x	..	....
x	..	..	R	..	..	....	....	....	....	..	x	..	....
x	x	..	..	..	..	....	....	5 mos.	pelvis	..	x	..	....
x	x	..	..	..	..	....	....	4 mos.	lungs	..	x	..	9 mos.
x	..	..	..	..	..	....	4 mos.	....	....	..	x	..	12 mos.
x	..	..	..	..	..	....	....	4 mos.	skin	..	x	..	5 mos.
x	x	R	..	B	..	4 mos.	2 mos.	6 mos.	skin	..	x	..	12 mos.
x	x	..	..	..	..	....	....	2 mos.	lungs	..	x	..	2 mos.
..	x	..	..	..	..	....	....	....	....	x	..	..	....
..	x	..	R	B	..	....	7 mos.	....	....	x	..	..	....
x	..	..	..	B	..	....	8 mos.	....	....	x	..	..	....
Ppr	..	..	..	..	..	....	3 mos.	....	....	x	..	..	....
x	x	R	..	B	..	....	....	12 mos.	skin	x	..	..	....
x	..	..	..	..	..	4 mos.	....	7 mos.	spine	x	..	..	....
x	..	..	..	..	..	....	....	....	....	x	..	..	6 mos.
x	x	..	..	..	..	....	....	4 mos.	general	x	..	..	4 mos.
..	x	..	..	..	..	....	....	....	....	x	..	..	1 mo.
x	..	..	..	PB	..	....	....	....	....	x	..	..	7 mos.
x	x	..	..	..	..	....	....	3 mos.	skin	x	..	..	4 mos.
..	x	..	..	..	..	....	....	7 mos.	spine	x	..	..	8 mos.
21	16	2	3	6	..	5	6	15	15	12	9	6	16

RECURRENCES

In cases where the primary mass and axillary glands completely disappeared we had four recurrences in the skin, but none in the axilla. Where the mass in the breast remained following treatment, and the patient refused removal, we had extension in 3 cases. When the breast was removed (simple mastectomy) following irradiation, there were 3 recurrences in the skin. Distant metastasis occurred in 16 of the irradiated cases, 22 per cent. Distant metastasis occurred in 19 of the surgically-treated cases, 32 per cent. This percentage is not so high as in radical surgery, so that the dissemination of infection by needle puncture may or may not be a factor. We believe it is not.

CONTRAINDICATIONS FOR IRRADIATION BY RADIUM HALSTEAD

Anæmia and hæmoglobin of less than 30 per cent; decreased kidney function; grave cardiac dysfunction; multiple distant metastasis.

SELECTION OR CLASSIFICATION OF CASES

We irradiated every breast case that was admitted, regardless of group, age, debility, or intercurrent disability, also regardless of size, shape, or degree of involvement of the breast. We feel that cases should be classified into surgical, radium, and radiological groups. Lee's classification[2] of a case considered operable is altogether too broad. He classifies as operable "a patient with a tumour of the breast that is not fixed to the chest wall, with or without invasion of the axillary lymph nodes". The surgical results would be at least 100 per cent higher if Portman's classification as to what is surgical were the standard, that is: (*a*) No œdema of the skin (pig or orange skin); no brawny or red induration, and inflammation; no multiple nodes; no ulceration. (*b*) No œdema of the breast; no diffuse infiltration of the breast; no multiple tumours in the breast; no fixation of the breast or tumour to the chest wall. (*c*) No metastasis, as, axillary nodes,

TABLE IV.

Classification D

Group IV.—(25) Cases who have had previous treatment for primary breast cancer and have come to the clinic with recurrence

Irradiation		*Irradiation then Surg.*	*Surgery then irradiation*	*Biopsy*	*Surgery only*	*Disappearance primary mass*	*Disappearance of glands*	*Appearance of metastases after admission*	*Site of metastases*	*Admitted*			*Deaths after treatment*
Radium	*X-ray*									*1 yr. ago*	*2 yr. ago*	*3 yr. ago*	
..	Ppr	..	..	..	..	....	....	....	....	..	..	x	....
..	Ppr	..	..	..	..	4 mos.	....	....	....	..	..	x	....
Prr	..	..	S	B	..	....	....	....	....	..	..	x	....
Prr	..	..	..	..	..	....	5 mos.	....	....	..	..	x	15 mos.
Ppr	x	..	..	B	..	....	....	11 mos.	general	..	..	x	24 mos.
Prr	..	..	..	..	..	....	....	....	....	..	..	x	24 mos.
Ppr	..	H	..	B	..	5 mos.	....	19 mos.	pelvis	..	..	x	24 mos.
Ppr	x	..	..	..	..	5 mos.	....	....	....	..	x	..	....
Prr	..	..	..	B	..	....	....	....	....	..	x	..	....
Prr	x	..	..	B	..	....	....	14 mos.	spine	..	x	..	....
Ppr	..	..	..	PB	..	2 mos.	2 mos.	9 mos.	lungs	..	x	..	11 mos.
Prr	..	..	..	B	..	....	....	....	....	..	x	..	24 mos.
Prr	x	..	..	..	..	2 mos.	....	2 mos.	lungs	..	x	..	6 mos.
Ppr	..	..	..	..	..	....	....	....	....	..	x	..	6 mos.
..	Ppr	..	..	..	..	....	....	9 mos.	pelvis	..	x	..	12 mos.
Ppr	..	..	..	PB	..	....	....	....	....	x	..	..	....
Prr	..	..	..	B	..	....	....	7 mos.	lt. ileum	x	..	..	....
Ppr	..	..	..	..	..	....	2 mos.	....	....	x	..	..	....
..	..	..	..	B	S. Ppr	....	....	1 mo.	omentum	x	..	..	1 mo.
..	Ppr	..	..	..	..	....	....	3 mos.	chest & lungs	x	..	..	3 mos.
Ppr	x	..	..	B	..	....	....	1 mo.	chest	x	..	..	2 mos.
Prr	x	..	..	..	..	....	....	....	....	x	..	..	6 mos.
..	Ppr	..	..	PB	..	....	....	2 mos.	chest & pelvis	x	..	..	4 mos.
Prr	x	..	..	PB	..	....	....	2 mos.	elbow	x	..	..	7 mos.
Ppr	x	..	..	PB	..	....	....	4 mos.	lungs	x	..	..	6 mos.
19	13	1	1	14	1	5	3	13	13	10	8	7	16

suprascapular nodes; no œdema of the arm; no distant metastasis.

REFERRING TO STEINTHAL'S CLASSIFICATION OF GROUPS I, II, III, AND IV

Group I.—Cases having only a primary lump, *not* fixed to the skin or ribs, and without palpable axillary lymph nodes, may be treated by a radical surgical Halstead. The results are relatively similar to irradiation treatment. But Groups II and III should be considered primarily radiological. Lee[2] reported 69 per cent clinical five-year cures by the radical surgical method, according to his classification of Group I. Neill[3] reports 50 per cent. Nicolson and Berman,[4] Steiner's Clinic, report 47.5 per cent. Continental surgical statistics give similar percentages.

The results by irradiation treatment show a like rating where a combination of radium and deep x-ray was practised, or assisted by simple surgical procedures. Keynes, *using radium alone,* reported 86.5 per cent three-year cures, and his five-year results are higher than by surgical methods. The Soiland Clinic[5] reported on a small group 63.6 per cent as living from four years three months to one year eight months after treatment by radium and x-ray.

The results in our Clinic, as tabulated by the Department of the Cancer Commission, were 93.3 per cent in Group I, treated by radium alone. Groups II and III, according to Portman's classification and our experience, are not deemed operable. Metastatic axillary lymph nodes removed surgically tend to recur. Supraclavicular nodes cannot be successfully removed *in toto.* Recurrence following interstitial irradiation is less common.

The percentage of surgical five-year cures in Group II falls to 30 per cent and even lower in the best surgical clinics. Irradiation has a small lead of 35 to 45 per cent. Our small group is 75 per cent, treated by radium alone.

TABLE V.

Stage of disease	*No.*	*Total cases* 1 yr.	2 yr.	3 yr.	*Alive* 1 yr.	2 yr.	2 yr.	*Died of cancer* 1 yr.	2 yr.	3 yr.	*Percentage for Cases living* 1	2	3	*Total 3 yrs.*
RADIUM TREATMENT ONLY														
Group 1	15	8	6	1	8	6	0	0	0	1	100.0	100.0	0	93.3
Group 2	14	7	2	5	5	2	4	2	0	1	71.0	100.0	80.0	75.0
Group 3	10	5	3	2	3	1	1	2	2	1	60.0	33.0	50.0	50.0
Group 4	9	3	4	2	3	1	0	0	3	2	100.0	25.0	0	45.0
Totals			48			34			14					70.8
RADIUM AND X-RAY TREATMENT														
Group 1	6	1	2	3	1	2	2	0	0	1	66.6	100.0	100.0	83.0
Group 2	14	4	5	5	3	4	2	1	1	3	75.0	80.0	40.0	65.0
Group 3	8	2	4	2	0	2	0	2	2	2	0	50.0	0	25.0
Group 4	8	4	3	1	0	2	0	4	1	1	0	66.6	0	25.0
Totals			36			18			18					50.0
RADIUM AND SURGERY														
Group 1	7	4	0	3	4	0	2	0	0	1	100.0	0	66.0	87.0
Group 2	7	0	3	4	0	3	4	0	0	0	0	100.0	100.0	100.0
Group 3	1	0	1	0	0	1	0	0	0	0	0	100.0	0	100.0
Group 4	2	0	0	2	0	0	1	0	0	1	0	0	50.0	50.0
Totals			17			15			2					88.2

Under the treatment of radium and surgery 11 cases received surgical treatment and were then given radium, and of the 2 dead, 1 received radium first, and 1 received surgical treatment first.

RADIUM, X-RAY AND SURGERY														
Group 1	3	1	0	2	1	0	2	0	0	0	100.0	0	100.0	100.0
Group 2	4	2	0	2	2	0	0	0	0	2	100.0	0	0	50.0
Group 3	2	1	1	0	1	0	0	0	1	0	100.0	0	0	50.0
Group 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals			9			6			3					66.6

Under the treatment of radium, x-ray and surgery, 5 received surgical treatment first. Of the 3 dead, 2 received surgical treatment first.

While in Group III surgical statistics fall almost to the vanishing point, or 3 per cent, irradiation figures rise to 12 to 18 per cent. Our group, with radium treatment only, showed 50 per cent.

Portman,[6] of Crile's Clinic, reported that irradiation treatment following radical surgery of a group studied between June, 1922, and August, 1930, showed that the patients had a 10 per cent longer term of life than those treated by surgical methods alone. In Group IV nine cases were treated with radium (45 per cent), but none survived the three-year period.

The Table shows a comparison of cases treated by other methods than by radium alone, as, radium and x-ray, radium and surgery, radium, x-ray and surgery. The radium and surgery group appears high because the breast was removed following radium treatment. Few radical Halstead operations were performed.

Group IV.—Nine cases treated by radium show a percentage of 45; those by radium and x-ray (8 cases), 25 per cent; radium and surgery (2 cases), 50 per cent—one living and one dead; by radium, x-ray, and surgery — none living.

Classification A.—Group I.—Thirty-five cases.

Studying the Table in Group I, treated by irradiation, or surgery, or the combination of the three, we find the following. Thirty-one had radium treatment; of these 1 had a previous partial surgical removal; 1 had a radical surgical removal. Of those who had irradiation followed by surgery, 1 had a radical Halstead; 3 a simple breast amputation. Preoperative biopsies were made in all cases, except where an operation was previously performed.

The primary mass disappeared in 11 cases, while in 15 the mass was either removed previous to irradiation or following radium treatment. Metastasis appeared in 4 cases, but none occurred in the treated areas; one growth recurred in a radium-treated case, involving the liver and pleura. So that in Group I we have 17 patients living 1 year, 8 patients living 2 years, 10 patients living 3 years.

Three deaths occurred, in a time varying from nine months to one year nine months. One of these patients had a surgical Halstead and lived nine months. Two died following irradiation without surgery; one lived one year three months, and the other lived one year nine months.

Classification B. — Group II. — Forty-three cases.

Thirty-nine patients had radium, 4 of them having had previous partial removal. Two had deep x-ray only. Nineteen had x-ray and radium. Biopsies were made in all cases, except in those in which the diagnosis was self-evident.

The primary mass disappeared in 20 cases following radium treatment. In 18 cases mass removed either before or after irradiation. The glands disappeared following radium treatment in 13. This group had metastasis of the skin in 1 radium-treated case; no axillary glands in radium-treated cases; the balance, 10 cases, had distant metastatic growths.

In Group II we have 14 patients living 1 year, 13 living 2 years, 16 living 3 years. Ten are dead.

Classification C.—Group III. — Twenty-seven cases.

Twenty-one had radium; 2 only had previous partial surgical removal; 5 had x-ray only; 2 had a simple removal of the breast.

In this advanced group the masses disappeared in 5, and glands were not palpable in 6, following irradiation. Metastasis occurred in 15, of which there were recurrences in the skin in 6; three of these were treated with radium. Lymph nodes were found in 1 case only, radium-treated. Twelve of this group are living 1 year; 9 living 2 years; 6 living 3 years. Sixteen have died. Of these the longest-lived survived three years and six months, the shortest two months. Note that in this group there was only one case with recurrence in the axilliary glands.

Classification D. — Group IV. — Twenty-five cases.

This group is a most important group, in that it shows that with operative interference, either by partial removal or by the radical method, the number of metastases appears very high. In this group the glands disappeared in 3 cases All had metastasis. Thirteen of the 19 had further metastatic areas, beginning from one month to one year two months, following irradiation, and 13 in which the metastatic areas were generalized or in other parts of the body.

Of Group IV 10 are living 1 year; 8 living 2 years; 7 living 3 years. Sixteen of the 25 are dead.

CONCLUSION

The results shown in the treatment of cancer of the breast by radium, x-ray, and surgery, tend to favour the irradiation method in preference to radical surgical procedures in all groups of cancer of the breast. Especially is the irradiation method indicated in Groups II and III, and even in Group I the percentage is comparable with surgical procedures.

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A FURTHER REPORT ON THE ASCORBIC ACID TREATMENT OF WHOOPING COUGH*

BY M. J. ORMEROD, M.B., BYRON M. UNKAUF, M.D., B.SC.(MED.) AND F. D. WHITE, PH.D., F.I.C.

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IN a previous communication[6] two of us (M.J.O. and B.M.U.) gave an account of the treatment of 10 cases of whooping cough with ascorbic acid (synthetic vitamin C). While the small number of cases forbade any statistical conclusions they nevertheless did show that this treatment had an almost specific effect in decreasing the intensity and duration of the disease. At the time of forwarding the above paper we believed this to be an entirely new system of treatment, but we have since discovered that Otani[7] had published his results in treating 81 cases of whooping cough with ascorbic acid, and we take this opportunity of acknowledging his priority and confirming his results. His method of treatment was the intravenous injection of the same brand of ascorbic acid (Redoxon-Hoffmann-La Roche) as we have used orally, and his patients were drawn from hospital clinics, while ours were treated in the home. He does not give much detail in the paper but his general conclusions are matched by ours. In hospital work the intravenous method may be ideal, but where oral use is possible and efficient, as it is here, we believe the greater simplicity and reduced cost (about one-fifth that of the intravenous method) of our method is more suited to general practice.

In the present communication we present the results in 17 additional cases of whooping cough treated by oral administration of ascorbic acid. An attempt was made to gain a more accurate idea of dosage and utilization of the vitamin by studying its urinary excretion before and during treatment. There is only a limited capacity for storage of the vitamin in the body, and excess is rapidly excreted by the kidney. When first seen many of the patients were excreting almost no ascorbic acid; others of slightly better financial circumstances showed small amounts, but still below normal figures. As treatment was begun the excretion of the acid rose, and when saturation of the tissues was complete there was a sharp well-maintained rise in excretion of the acid. Cured cases responded like normal cases; small additional amounts added to the usual intake caused corresponding rises in urinary values. Our first 5 patients were given the vitamin all in one dose each day, but this proved to be a poor method. According to Widenbauer,[10] such administration leads to excretion of large amounts in the urine, but does not give a true saturation of the tissues. Accordingly, our other patients were given the vitamin in divided doses daily, which gave much better excretion curves and a more accurate estimation of the degree of saturation of the body. The technique of the urinary estimations, and some of the graphs obtained, as carried out by one of us (F.D.W.), are given below.

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The technique adopted was that of Harris and Ray,[5] slightly modified. This technique involves the analysis of the total 24-hour excretion of urine, the urine being preserved with 10 per cent of its volume of glacial acetic acid, and analyzed within 12 hours of voiding. When patients (and, in particular, children) are being treated in their own homes it is no easy matter to ensure that the total output is obtained over a period of 14 to 21 days, while the cost of the glacial acetic acid required is by no means a negligible matter. As the patients we were treating were all receiving daily large amounts of ascorbic acid it seemed to us that analyses of single urinary specimens, voided at the same time each day, would under the circumstances give us as much information regarding the comparative ascorbic acid excretion as would a 24-hour specimen. Accordingly, we decided to analyze the first sample of urine voided each day, and made arrangements for this to be collected in bottles containing a known amount of glacial acetic acid, the amount of acid being calculated to ensure that it was at least 10 per cent of the total volume. The samples were all analyzed within three to four hours by titration with dichlorphenol-indophenol. The specificity of this method of estimation has been questioned by Wacholder and Hamel,[9] Ferrand and Policard[4] and others, but the wide acceptance of this method, its simplicity from a routine standpoint, and the fact that we were not concerned with the exact ascorbic acid content of the urine so much as with the comparative rise and fall in the titration values during therapy, influenced us in adhering to it.

Our primary consideration being the adoption of a method of estimation which, while being reasonably accurate, could be carried out easily by clinical technicians, we used the Hoffmann-La Roche dichlorphenol-indophenol tablets. One tablet, containing 0.002 g. of the sodium salt, was dissolved in 50 c.c. of distilled water, and 1 c.c. of this solution (equivalent to 0.02 mg. ascorbic acid) was used for the titration. The dye solution was made up freshly every 3 days. Otherwise, the details were strictly in accordance with the recommendations of Harris and Ray.

Typical results are shown graphically in Charts 1 and 2.

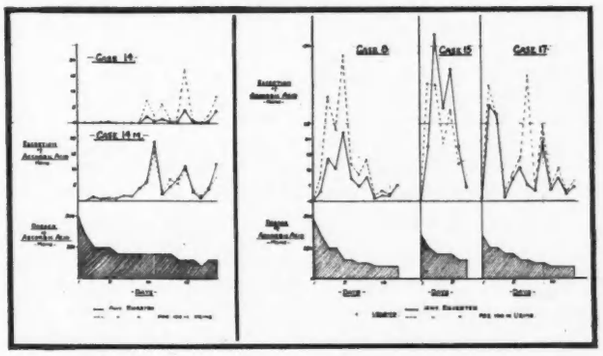

Chart 1 Chart 2

Chart 1.—Case 14 is a 7 months old infant on the breast. Case 14m is the mother. Therapy to mother.
Chart 2.—Typical responses to routine dosages of ascorbic acid.

Our plan of dosage was modified from that of Widenbauer[10] in which large "loading" doses are given for a short time and then the daily dosage is reduced during the remainder of the time. Our first few cases were started with too high dosage, and this proved wasteful. We finally adopted the following routine of daily dosage: 350, 250, 250, 200, 200, 150, 150, 125, 125, 100, continuing at the 100 mg. level until the case was complete, or stopping the dosage at any stage at which there was a complete remission of symptoms for two days. The average total dose was about 2,700 mg. We disregarded both age and weight of the patient, preferring to simplify the method by making routine tables of dosage. As even excessive doses of the vitamin do not produce undesirable effects, owing to rapid excretion of excess, and since the cost of the medication is very reasonable this method seemed best adapted for use by the general practitioner. Where a large number of patients are to be treated, as in institutional work, this scale of dosage might perhaps be reduced slightly, but there is a definitely increased demand for vitamin C in whooping cough, and we prefer to over-supply rather than under-supply this need.

Where a case does not respond to this routine dosage experience has taught us to inquire into the amount actually taken by the patient. Thus, in one case where urinary analyses and clinical reports fluctuated wildly, we found that the mother had dissolved the daily dose in a quart of milk and that the dosage depended upon how much of the milk was taken by the child. As a rule, parents are only too glad to administer the medication faithfully as soon as they find that better sleep for the whole family is the result. The ascorbic acid is in the form of tablets, combined with lactose, and will dissolve easily in water, milk or fruit juices, or it may be eaten like a candy, as it has a not unpleasant sour taste.

A patient on routine dosage who shows a sudden drop in urinary excretion, even when medication is taken, usually shows a corresponding change in the clinical picture. The development of the whoop seems to use up a large amount of vitamin. This would appear to strengthen Brown's[1] suggestion of a pertussis toxin which has an affinity for nervous tissue, and particularly since Otani[7] has shown that vitamin C has a definite antagonistic action on the toxin from the Bordet-Gengou bacillus. Where whoop develops during the treatment the dosage may be increased slightly for a few days if desired, but we find that the whoop is mild and soon disappears under the routine dosage.

Cases are reported briefly below.

CASE 1

F., 7 years. Day cough 12 days; night cough 10 days; no whoop or vomiting. Urinary ascorbic acid less than 0.3 mg./100 c.c. Dosage, 500 mg. every second day for 3 doses, then daily doses averaging 200 mg. Day cough marked 8 days, slight 6 days; night cough marked 2 days, slight 4 days. No whoop. Slight vomiting for 3 days about a week after beginning treatment. Duration of disease, 15 days; total amount of drug, 3.0 g.

CASE 2

M., 6 years. Day cough 7 days, night cough 4 days; no whoop or vomiting. Urinary ascorbic acid less than 0.2 mg./100 cc. Treated similarly to Case 1, but with smaller doses. Day cough marked 6 days, slight 3 days; night cough marked 3 days, slight 3 days. No whoop or vomiting. Duration of disease, 9 days; total dosage, 2.0 g.

CASE 3

F., 2½ years. Day cough 7 days, night cough 6 days; no whoop or vomiting. Urinary ascorbic acid less than 0.2 mg./100 c.c. Preliminary dosage 250, 250, 500 every second day, then daily doses averaging 150 mg. Day cough marked 5 days, slight 9 days; night cough marked 5 days, slight 3 days. No whoop or vomiting. Duration of disease, 14 days. Total dosage, 2.25 g.

CASE 4

F., 6 years. Day cough 11 days, night cough 7 days; whoop 4 days, no vomiting. Urinary ascorbic acid 1.0 mg./100 c.c. Treatment, 500 mg. daily for 3 days, then daily doses averaging 200 mg. Day cough marked 12 days, slight 2 days; night cough marked 3 days, slight 2 days. Whoop marked 10 days, slight 2. Slight vomiting on 4th, 6th 7th, and 8th days. Duration of disease, 14 days; total dosage, 3.1 g.

CASE 5

F., 6½ years. Day cough 7 days, night cough 5 days, whoop 1 day, vomiting 1 day. Urinary ascorbic acid 1.9 mg./100 c.c. Treatment, 500 mg. on first day, then doses averaging 175 mg., daily. Day cough marked 4 days, slight 8 days; night cough stopped from the first. Whoop marked 1 day, slight 9 days. Slight vomiting on the 4th, 5th, and 6th days. Duration of disease, 12 days; total dosage, 1.97 g.

CASES 6 AND 7

These cases were uncontrolled by attendants and varied so widely that they are not reportable with the others of this series.

CASE 8

F., 3 years. Day cough 5 days, night cough 2 days. No whoop. Vomiting 1 day. Urinary ascorbic acid 0.37 mg./100 c.c. The remainder of the patients in the series were given dosage regularly and in divided doses, and urine specimens were from the first voiding in the morning. Dosage here, 500, 350, 250, 250, 150, 125, 125, then 100 mg. daily. Day cough marked 8 days, slight 10 days; night cough marked 3 days, slight 12 days. No whoop. Vomiting slight, only on 6th to 15th days. Duration of disease, 18 days; total dosage, 3.0 g.

CASE 9

M., 7 yrs. Day cough 4 days, night cough 4 days; no whoop or vomiting. Urinary ascorbic acid less than 0.2 mg./100 c.c. Treatment as for Case 8. Day cough almost incessant at first; attacks greatly reduced in number in 3 days, remained marked for 7 days, slight for 8 days. Night cough marked 5 days, slight 9 days. No whoop or vomiting. Duration of disease, 18 days; total dosage, 3.0 g.

CASE 10

M., 6 years. Day cough 21 days, night cough 21 days; no whoop; vomiting 2 days. Urinary ascorbic acid 1.7 mg./100 c.c. Treatment as for Case 8. Day cough 15 times daily at start; 12 attacks each for next two days, then about 5 per day for next 6 days, then 2 slight coughs daily for 5 days. Night cough marked 3 days, slight 5 days. No whoop. Slight vomiting 6 days. Duration of disease, 14 days; total dosage, 2.85 g.

CASE 11

M., 5 years. Day cough 7 days, night cough 3 days; whoop 1 day, no vomiting. Urinary ascorbic acid 1.58 mg./100 c.c. Therapy, 500, 350, 150, 150, 150, 125, 125, then 100 daily. Day cough 12 times daily at start for 2 days, then 5 the next day, then slight cough 15 days. Night cough, 6 attacks for first two nights, then only slight for 10 days. Whoop once daily for 5 days, slight 8 days. Slight vomiting on 6th and 11th days. Duration of disease, 18 days. Total dosage, 2.82 g.

CASE 12

F., 25 years. Day cough 21 days, night cough 12 days; no whoop; vomiting 7 days. Urinary ascorbic acid 0.97 mg./100 c.c. Therapy, 375, 250, 200, 200, 150, 150, 150, 125, 125. Day cough 6 on first day, none on second day, then 7, 4, 2, and none on following days. Night cough none on first night, 3 second night, none thereafter. Vomited only once, on 3rd day. Duration of disease, 6 days; total dosage, 1.72 g.

CASE 13

F., 36 years. Day cough 21 days, night cough 21 days; whoop 14 days, no vomiting. Urinary ascorbic acid 1.45 mg./100 c.c. Therapy, 500, 350, 250, 150, 150, 125, 125, 100, 100, 100. Day cough marked 4 days, then stopped abruptly. Night cough 3 on first night, then none thereafter. Whooping once on 2nd and 4th day only. No vomiting. Duration of disease, 4 days; total dosage, 1.95 g.

CASE 14

F., 7 months, on breast. Day cough 4 days, night cough 2 days; no whoop or vomiting. Urinary ascorbic acid less than 0.3 mg./100 c.c. As child was still on breast, ascorbic acid was given to mother (Case 14m) so that ample amounts would be excreted in the milk. Day cough marked 5 days, slight 6 days; night cough marked 4 days, slight 2 days. 1 slight whoop on first day, then none. No vomiting. Duration of disease, 11 days.

CASE 14M

F., 26, (mother of Case 14). No symptoms. Urinary ascorbic acid less than 0.5 mg. per 100 c.c. Therapy, 500, 350, 250, 250, 250, 200 daily for next 8 days, then 150, 150, 150, 100, 150, 150. Total dosage, 4.05 g. (see Chart 1).

CASE 15

M., 3½ years. Day cough 10 days, night cough 10 days; no whoop or vomiting. Urinary ascorbic acid 0.85 mg./100 c.c. Therapy, 350, 250, 200, 200, 200, 150, 150. Day coughs 4 on first day, 1 on second day, 2 on third day, thereafter none. Night cough, 2 on first night, thereafter none. No whoop or vomiting. Duration of disease, 3 days; total dosage, 1.5 g.

CASE 16

F., 3½ years. Day cough 3 (?) days, night cough 14 days; no whoop; vomiting 3 days. Urinary ascorbic acid 2.9 mg./100 c.c. Therapy, 350, 250, 250, 200, 200, 150, 150, 150, 150, 125, 125, then 100 mg. daily. Day

cough 15 on first day, night cough 7; whoop 1; vomited 22 times. Second day, 3 day coughs, 7 night coughs; 1 whoop; 10 vomitings. Third day, 2 day coughs, 7 night coughs; 3 whoops; 2 vomitings. Day cough marked for another 2 days, then slight for 8 days. Night cough marked 3 days, slight 4. Whoop none after 3rd day. Slight vomiting on 4th, 5th, 7th and 8th days. Duration of disease, 13 days; total dosage, 2.57 g.

CASE 17

M., 3 years. Day cough 14 days, night cough 10 days; no whoop; vomiting 7 days. Urinary ascorbic acid 1.0 mg./100 c.c. Therapy, 350, 250, 250, 200, 200, 150, 150, 125, 125, 100 daily thereafter. First day, 12 day coughs, 8 night coughs; no whoop; 20 vomitings. Second day, 6 day coughs, no night cough or whoop; 2 vomitings. Thereafter, day cough marked 5 days, slight 2 days; night cough, whoop and vomiting, none. Duration of disease, 9 days total dosage, 2.3 g.

CASE 18

F., 17 months. Day cough 3 days, night cough 2 days; no whoop or vomiting. Urinary ascorbic acid less than 0.5 mg./100 c.c. Therapy similar to Case 17. First and second days, 15 day coughs, 12 night coughs; 1 whoop each day. Third day, 1 day cough, 2 night coughs; no whooping or vomiting. Thereafter, day cough slight 6 days, night cough; whoop and vomiting, none. Duration of disease, 9 days; total dosage, 2.35 g.

CASE 19

M., 2½ years. Day cough, 7 days; night cough 3 days; no whoop or vomiting. Urinary ascorbic acid 0.65 mg./100 c.c. Therapy, 350, 250, 250, 250, 250, 200, 200, 150 mg. thereafter. Day cough over 20 for each of first two days; night cough, same; no whoop or vomiting. Thereafter, day cough marked (12 to 16 attacks daily) for 8 days, then slightly less numerous and less intense for 10 days. Night cough marked for 5 days, slight for 7 days. Slight whoop on 9th to 14th days. Slight vomiting on 3rd, 7th, 8th and 9th days. Duration of disease, 15 days; total dosage, 2.95 g. This case proved the most resistant of all our series. Urinary analysis showed that the medication was taken faithfully, and we have no explanation, other than a possibly overpowering amount of toxin as shown by the severity and number of coughs, for the long delay in improving the symptoms. However, when the patient did respond the symptoms improved rapidly.

In the case reports, we have used the word "slight" to show various modifications of the symptoms. Slight cough indicates a short loose cough without any considerable respiratory embarrassment. Slight whoop denotes a shortened and more quiet type than usual. Slight vomit indicates that there is no true vomiting, in the sense of expulsion of gastric contents, but rather the expectoration of mucus. We have accepted as the duration of the disease the time required for the complete or almost complete arrest of the symptom which tends to remain longest in whooping cough—the day cough. Even with this standard, the average duration for 15 children above is only about 13 days. The two adults were cured in 4 and 6 days, respectively.

Clinical changes occurred in the following order. (1) Marked reduction or complete arrest of vomiting; (2) reduction or disappearance of night cough; (3) reduction in number or intensity of whoop; (4) reduction in number or intensity of day cough.

We consider a case cured when whoop, vomiting and night cough have disappeared, and the day cough is present, if at all, in very slight form. Urinary analysis serves as a guide also: a cured case responds to a small additional dose by a corresponding rise in the urinary excretion of ascorbic acid. In many cases we have continued the administration of 100 mg. for a few days after the symptoms had subsided. Occasionally some of the patients have a short (2 to 3 days) exacerbation of the symptoms after treatment is stopped, and this small additional administration serves to prevent it.

The change in the general condition of the patients is rapid and clearly noticeable. Due possibly to better rest, they soon become much more lively in habit. Appetite improves from the first. The change from a child who fears to undergo any exertion because of the prolonged coughing spell and possible vomiting that ensues, to a child who plays about with only an occasional irritative cough is gratifying to both parent and physician.

Cases 14 and 14m are worthy of special mention. Case 14 is that of a 7 months old infant still on the breast, and Case 14m is the mother. For a suckling infant to have whooping cough is most unusual as, according to Correns,[2] Wacholder,[8] and Ferdinand,[3] ample amounts of ascorbic acid for a growing infant are excreted in human milk, even a year after delivery of a child. On inquiry, we found that the mother in this case had deleted fresh fruits from her diet because she found they produced colic in the child. Titration of her urine showed an almost complete absence of ascorbic acid, and hence an almost complete depletion of her body stores of vitamin C. Widenbauer[11] states that a pregnant woman requires two and one-half times the normal dosage of ascorbic acid from the third month on, and a lactating woman requires double the normal amount, of which half is excreted in the milk. Accordingly, we kept the mother's dosage at higher levels for a longer period than usual, and in another case of the same type would increase our scale of dosage still more. The infant's excretion of ascorbic

acid remained minimal until the mother began to excrete appreciable amounts in her urine. From this point on the child's excretion rose parallel with the mother's, and clinical improvement corresponded. We believe other nursing mothers may have had this same difficulty with fruits in the diet, and suggest the administration of ascorbic acid as an easy way out of the difficulty, as no unwanted digestive disorder occurred in the child following its use.

Case 15 shows an excellent response to therapy in a moderate case. Here, day and night cough of 10 days' duration responded to 3 days' treatment by complete remission, without recurrence.

Very little difference in the average daily need of vitamin C is shown between adults and children. Widenbauer[11] estimated daily intake and excretion of ascorbic acid in normal persons over a period of weeks, and found the requirement for an adult to be 27 to 28 mg. per day more than the amount excreted in the urine. A normal child of 3 years showed a requirement of 21 to 22 mg. per day over excreted amounts. The same author shows that the taking of thyroid also raises the requirement of vitamin C, and so, possibly, the difference in weight between adult and child may be almost compensated for by the more rapid metabolism of youth. Harris and Ray[5] administer 600 mg. of ascorbic acid to adults as a test for hypovitaminosis-C, so that our "loading" dose of 350 mg. in a child does not seem out of place, particularly as we find C-unsaturation as an almost invariable occurrence in whooping cough.

A word may be ventured as to dietary sources of vitamin C. Samples of orange juice have been estimated by various investigators to contain from 10 to 20 mg. of ascorbic acid per ounce. Oranges thus prove, at least in this part of the country, to be at least two or three times as expensive a source of the vitamin as the brands of ascorbic acid now on the market. Milk is hopelessly inadequate as a source of vitamin C, as, according to Correns,[2] pasteurized milk, even in midsummer when green feed is plentiful for cows, contains only 1.26 to 1.91 mg. per 100 c.c. Even unpasteurized milk, after standing 24 hours, contains very small amounts. Widenbauer,[10] investigating children in hospital in Danzig on standard or special diets, (according to illness), found that practically all of them were lacking in vitamin C, although there were no cases of scurvy among them. Evidently, hypovitaminosis-C may be of much commoner occurrence than has been considered hitherto, and as long as it is not severe enough to show as clinical scurvy may pass unrecognized unless chemical investigation of urinary ascorbic acid is carried out.

CONCLUSIONS

1. Chemical examination of the urine shows varying degrees of hypovitaminosis-C in whooping cough.

2. Saturation of whooping cough patients with ascorbic acid decreases markedly the intensity, number and duration of the characteristic symptoms.

3. A simplified routine for such treatment is described, as used by us in this series of cases of whooping cough.

We wish to express our thanks to Messrs. Hoffman-La Roche for supplying us with the ascorbic acid ("Redoxon") used in these cases.

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PATHOGENESIS OF ACUTE GLAUCOMA.—A. Brav is dissatisfied with most of the theories advanced on this subject. He believes that acute glaucoma is caused by increasing pressure on Schlemm's canal from hypertrophy of the ciliary processes. The proper use of optical corrections, which had been prescribed first before the age when prodromal symptoms might be expected, would prevent the onset of this condition. Eserine, by pulling upon the ciliary body, and iridectomy, by producing a cyclodialysis, both release pressure on the canal of Schlemm.—*Med. Rec.*, June 2, 1937, p. 447. Abs. in *Brit. M. J.*

Case Report

MISSED ABORTION

BY ROSS MITCHELL, M.D.

Winnipeg

Mrs. S.Z., aged 21, sought advice on April 12, 1937, because, though she had not menstruated for nearly 9 months and had been assured she was pregnant, there was no increase in the size of the abdomen and she could not feel fetal movements.

The onset of menstruation occurred between 11 and 12 years of age; her periods lasted 6 to 7 days and recurred every 28 days. The family history had nothing of importance. She was married May 31, 1936, and menstruated in June and July, 1936, the latter period beginning on the 15th. Her previous health had been good. She had had some vomiting for 2½ months. Early in November, after being at a dance, she had a very slight blood-stained discharge lasting less than an hour. The doctor who was summoned found that she was pregnant and insisted on rest in bed. As she approached the expected date of confinement it was noticed that the outward and visible signs of pregnancy were not present. An x-ray of the pelvis taken on April 7th showed no trace of a fetal skeleton.

The patient was a well-nourished young woman weighing 116½ pounds. At her marriage she weighed 105 pounds. Blood pressure was 114/74; urine negative. The breasts were small, the areola narrow, with no tubercles of Montgomery present. The abdomen was flat, but on deep palpation a firm mass could be felt rising to 10 cm. above the symphysis. The vagina was small, firm and rather dry; the cervix small and hard. The uterus could be felt to be enlarged to the size of a three months' pregnancy. A Friedman test was reported negative on April 15th. A diagnosis of missed abortion was then made.

The treatment of this condition by massive doses of cestradiol benzoate, as suggested by Jeffcoate, was discussed with the patient, but after consulting with her husband and family she stated she preferred surgical measures. After consultation with Dr. D. S. MacKay, it was decided to remove the ovum by abdominal hysterotomy.

She entered St. Joseph's Hospital on April 22nd, and was operated upon next morning. The uterus was enlarged to the size of a three months' pregnancy. The right ovary was of normal size and showed a corpus luteum; the left ovary was smaller than normal. The uterus was incised and the whole ovum shelled out intact. There was practically no bleeding. The uterus was carefully sutured with No. 2 chromic catgut and the abdominal wall closed in three layers. Recovery was uninterrupted, and the patient left hospital on May 4th.

Through the courtesy of Professor Wm. Boyd, Dr. S. B. Thorson of the Pathological Department, Winnipeg General Hospital, has kindly contributed the following pathological report.

Gross specimen.—The specimen consists of a uterine cast measuring 8 cm. in length and 6 cm. in width. It is somewhat pear-shaped, being narrower at one end than at the other. The outer surface is slightly roughened and the whole mass is grayish in colour. The interior of the specimen is occupied by a smooth-walled cavity measuring 6 cm. by 4 cm. No fetus can be seen in the specimen.

Microscopic examination.—The section shows decidual tissue and chorionic villi in an extremely good state of preservation. The outer portions of these chorionic villi are covered by a layer of syncytial cells, the thickness of this layer varying in different places. There is complete absence of the layer of Langhans' cells. A few areas of calcification scattered throughout the necrotic portions of the specimen can be seen.

From a pathological standpoint two things are outstanding in the microscopic examination. (1) In this case no Langhans' cells could be seen. As the chorionic villi become more mature there is normally a disappearance of the layer of Langhans' cells and the syncytial cells become the prominent cells. This process is usually complete by the end of the second month of gestation. This definitely places the age of the pregnancy in this case at something over 2 months when the uterine contents became separated from the interior of the uterus. (2) A few chorionic villi were seen in a well preserved state, in the midst of masses of necrotic tissue. This is a very striking feature when it is considered how long the separated uterine contents were retained within the uterus.

The subject of missed abortion has received scant attention in British and American medical literature. The condition is usually regarded as very rare. E. Fraenkel in 1903 collected only 105 cases, but Litzenberg thinks the condition is much more common than is generally believed, as he had had 23 cases in his own practice. Since it is not uncommon for several weeks to elapse between death of the ovum and its expulsion, he places an arbitrary limit of two months after the death of the fetus, and does not consider the condition one of missed abortion until this period has elapsed. Ultimately the ovum is usually expelled, but it may be retained for months or even years. Putrefaction is rare and infection is infrequent. Polano and L. Fraenkel assert the possibility of complete resorption of the entire ovum. Hurd calls attention to the value of the Friedman test in missed abortion. As the placenta may continue to grow for a time after the death of the fetus, a negative finding is more important. Litzenberg recommends prompt emptying of the uterus once the diagnosis is made. It would appear that the failure of the uterus to expel the dead ovum is due probably to lack of œstrin.

Editorial

THE IDENTITY OF RHEUMATIC FEVER AND RHEUMATOID ARTHRITIS

IN this study we do not propose to enter the maze of classification as it relates to "rheumatism". We take it that what is meant by the terms rheumatic fever and rheumatoid arthritis is well enough known and commonly accepted. These two conditions, which present some resemblances and some differences, have been for years regarded as distinct; that they are actually one and the same needs some proof.

As long ago as 1881 Charcot[1] wrote of them: "There are not two fundamentally distinct diseases but only two manifestations of one and the same diathetic state." Fifty years later, in Osler's "Principles and Practice of Medicine", under the heading "Rheumatoid Arthritis", we read:[2] "Long believed to be associated with gout and rheumatism, this relationship is disproved." The work done subsequent to 1931, however, would seem to support Charcot. Klinge and Grzimek[3] are noteworthy among a number of investigators who believe that acute rheumatic fever and arthritis of the rheumatoid and osteo-arthritic types are merely different forms of the same pathological process. Timbrell Fisher,[4] in a recent paper, in our judgment, has clinched the matter. The failure to unravel the problem before this has been due largely to the fact that in the case of rheumatic fever attention had been focussed on the heart and the joints have received scant attention, while rheumatoid arthritis had been studied only in the late stages. Thus the full pathological picture and the sequence of events was not traced out. However, matters have improved, and the work of Allison and Ghormley,[5] done mainly on material from cases of rheumatoid and other forms of arthritis obtained from the operating room, merits careful study. The studies of Klinge and Grzimek and of Fisher have done much to piece out a clear and connected story.

Clinicians are well aware of certain differences which exist between rheumatic fever and rheumatoid arthritis. Speaking generally, in the former we have an acute or subacute articular or polyarticular disturbance of an obviously inflammatory nature, suggestive of an infection, and with a tendency to affect the heart; in the latter the process is insidious, sluggish, with a tendency to cause atrophy of the skin and certain muscles and deformity of the bones, progressing to osteophytic overgrowth. Yet there are also some clinical resemblances. In both, children and young adults are apt to be affected. There is sometimes also a familial distribution of cases in both. Acute rheumatic fever, while often acute, frequently shows relapses and recrudescences and may be prolonged for weeks or months; rheumatoid arthritis, while mostly chronic, also has its acute and subacute phases. Both affections may be associated with pyrexia, local signs of inflammation, lymphadenitis, and enlarged spleen. Both are sometimes complicated with endocarditis, pericarditis and pleuritis. In both subcutaneous nodules may be found. There is also evidence which goes to prove that the arthritis of rheumatic fever may on occasion persist in a form that cannot be distinguished from the rheumatoid type of arthritis, and that secondary osteo-arthritic lesions may eventually develop.

More cogent reasons for the identification of rheumatoid arthritis with rheumatic fever can be deduced from histological research. The subcutaneous nodules, above referred to, have been studied by Coats and Coombs,[6]

1. CHARCOT, J. M.: Clinical Lectures on Senile and Chronic Diseases, New Sydenham Society, London, 1881.
2. OSLER AND MCCRAE: Principles and Practice of Medicine, D. Appleton, New York and London, 1931, p. 1160.
3. KLINGE, F. AND GRZIMEK, N.: Das Gewebsbild des fieberhaften Rheumatismus, *Virch. Archiv.*, 1932, **284:** 646; *ibid.*, **286:** 333 and 344.
4. FISHER, A. G. T.: A contribution to the pathology of the rheumatoid type of arthritis and of rheumatic fever, *The Lancet*, 1937, **1:** 1162.
5. ALLISON, N. AND GHORMLEY, R. K.: Diagnosis in Joint Disease, Wood, New York, 1931.
6. COATS, V. AND COOMBS, C. F.: The rheumatic nodule, *Arch. Dis. of Childh.*, 1926, **1:** 183.

Freund,[7] Dawson,[8] Clawson and Wetherby,[9] and others, and it is now settled that the pathological condition is identical in the two affections. A step farther was taken by McEwen,[10] who stained the cells of the nodules by intravital methods and found that they were similar in the two cases. He found also that the staining reactions differ from those in other granulomata, such as those of syphilis and tuberculosis. Moreover, he has obtained the same specific staining reactions in the cells of the synovial membranes in cases of rheumatoid arthritis.

Timbrell Fisher (*loc. cit.*) lays considerable stress on a peculiar form of degeneration of the connective tissue, called "fibrinoid", which was known many years ago to occur in the lesions of rheumatic fever and, comparatively recently (1932), has been described by Klinge and Grzimek (*loc. cit.*) as occurring in the rheumatoid disease. Fisher has also found this type of degeneration in the synovial membrane in some of his cases, and agrees with Klinge that it is a characteristic feature of the rheumatoid type of arthritis of so-called unknown etiology, except in the very early and more chronic stages, and that this form of degeneration is not confined to acute rheumatism. The histological changes found in the synovial membrane in both acute rheumatic fever and rheumatoid arthritis are identical, and bear a strong resemblance to the picture found in the myocardium (Poynton, 1899; Aschoff, 1906; Coombs, 1911; and others), even to the presence of Aschoff bodies (Fisher, 1937). As a result of very careful studies, in which he has compared the histological pictures in uncomplicated cases of rheumatic fever and rheumatoid arthritis, Fisher presents a convincing argument in favour of the identity of the two affections. A.G.N.

7. FREUND, E.: Ueber rheumatische Knötchen bei chronischer Polyarthritis, *Wien. Arch. f. inn. Med.*, 1928, **16**: 73.
8. DAWSON, M. H.: Comparative study of subcutaneous nodules in rheumatic fever and rheumatoid arthritis, *J. Exper. Med.*, 1933, **57**: 845.
9. CLAWSON, B. J. AND WETHERBY, M.: Subcutaneous nodules in chronic arthritis: clinical, pathological, and bacteriological studies, *Am. J. Pathol.*, 1932, **8**: 283.
10. MCEWEN, C.: Cytological studies of granulomata and exudates from patients with rheumatic fever, *Am. Heart J.*, 1933-34, **9**: 101.

THE HEALTH OF THE COLLEGE STUDENT

THE health of their students is, or should be, a matter of concern to those who are in authority in colleges and universities. A sickly, feeble or otherwise disabled student is a liability to himself, his parents and his college. If he dies during the course of his studies the economic situation is still worse. It is indeed a poor investment from every point of view for colleges to accept students whose state of body and mind is such that they are unlikely to complete the curriculum. Once accepted, however, the responsibility of the college authorities towards their students does not cease. Supervision of health would seem to us to be as important as supervision of studies. For mind and body are inextricably linked together. One of the fundamental concepts of the ancient Greeks, to whom the modern world owes so much, more, indeed, than most of us realize, was the love of beauty—beauty of body as well as beauty of soul—*mens sana in corpore sano*, as the old saying runs. Should not we, with the infinitely wider scope permitted us, endeavour to live up to this high ideal? And where better can this endeavour take place than in institutions devoted to the pursuit of truth and the preparation for right living? No doubt, all educators will endorse these principles in the abstract. In practice performance has not yet caught up to precept.

The campaign for better health among students in the United States dates back some fifteen years, and the first move seems to have come from the college authorities themselves. The Presidents' Committee of Fifty on College Hygiene, an organization composed of college presidents and representatives, was established in 1922 "to stimulate the development and extension of instruction and training in hygiene in normal schools, colleges, and universities". Then in 1930 the American Student Health Association passed a resolution calling for "the operation of a college program which should include instruction in and development of physical and mental health, the supervision

of the care of individual student health and illness, the sanitation of student environment, and the study of health problems". Accordingly, the First National Conference on College Hygiene was held at Syracuse University in 1931. This gathering was sponsored by the Committee of Fifty, the American Student Health Association, and the National Health Council. Its purpose was "to focus the attention of our most competent authorities upon the identification of the basic problems of college hygiene; secure their expert analysis of those problems; and then have them formulate a consequent statement of their conclusions". The principle was laid down at this meeting that every college, regardless of size or resource, is under basic obligation, itself or through the parents of the students, or through appropriate community agencies, to arrange for the protection, maintenance and promotion of the health of its students, and for the detection, treatment and care of those of them who are physically or mentally sick or socially maladjusted. Further, the educational purposes of a college are not adequately served in the absence of suitable instruction on the subject of human health, as applied to the individual, the family, and society generally. Such topics as Health Service, Health Teaching, the Organization and Correlation of the Factors in a College Hygiene Program, and Special Problems, these last including such matters as Social Hygiene, Mental Hygiene, Tuberculosis, Cancer, Health in relation to Extra-curricular Activities, Nursing Problems, and Disaster Relief were fully considered.

A Second National Conference on College Hygiene was held at Washington, D.C., in December, 1936, and a copy of its Proceedings has just come to hand. It is clear that in the five years that have intervened between conferences progress has been made in breadth of vision and understanding of the many factors concerned with the health of college students. Yet, much remains to be achieved. As late as 1936 the United States Office of Education found that only one-third of the American colleges and universities required courses in hygiene. Why this is so is not quite clear. It is rather naïvely suggested that those who are shaping the policies of the other two-thirds have found their own physical foundations quite adequate for their purposes, and therefore do not realize that others are not all so fortunate. "The Second National Conference on College Hygiene has faced this problem frankly and boldly," to quote from the introduction to their Proceedings, "and has set forth definitely what it conceives to be the legal, social and educational responsibilities of presidents and governing boards of colleges and universities to provide for the establishment and maintenance of hygiene instruction and health service". And, again, "The time has come for college authorities to face squarely their responsibilities for the health of their students and to set standards in college hygiene as they have long done in other educational fields".

It is impossible for us to analyze the Proceedings of the Second Conference in detail. Suffice it to say that it is a most comprehensive document, and one cannot imagine any phase of the subject with which it deals that has been overlooked. Those interested cannot do better than look here for suggestion and inspiration. Those who are building a health program for educational institutions will find a scheme which they can copy, in whole or in part, as their inclinations and their purses dictate. The key note of the Proceedings seems to be Co-operation. Physical, Mental and Social Hygiene concern all departments of the colleges and all students should have the benefit of the accumulated wisdom from all sources. Personnel officers, religious advisers, students' counsellors, physical instructors, athletic trainers, and last, but not least, the personal or institutional physician, should work in harmony and along the lines of a concerted scheme. The National Conference on College Hygiene holds up an ideal and points out the way.

A.G.N.

Editorial Comments

The Supplement

This is the Supplement Issue of our *Journal*. Readers may know this by its inordinate size! It is not likely that anyone will read it all, except the General Secretary and his secretary, who have compiled it, the Editor, who has revised it, and the compositor, who has set it up. Others, doubtless, will beat shy. Nevertheless, anyone who has the leisure and the courage to read it through will be well repaid, for he will get an idea of the amount of work undertaken by the Canadian Medical Association such as he could not get in any other way. Indeed, the mere size of the supplement is an index of our growth. In 1932 the supplement occupied 27 pages; in 1937 it takes up seventy-one. Five years ago the business of the Association was chiefly internal, parochial, though in truth the Association was beginning then to experience "growing pains"; now, its business is largely external, touching not only the sphere of the medical man but also the well-being of the public whom he tries to serve. We need only cite some of the major topics which have been considered, to prove this point—Federation of the Provincial Societies, Medical Economics, Health Insurance, the Cancer Campaign, Hospital Service, Group Hospitalization, Maternal Welfare, Medical Education, the Registration of Specialists, the Intern, and the Code of Ethics—an important menu.

Federation has been brought appreciably nearer. The Committee on Constitution and By-Laws is authorized to make a few changes in the present regulations which will meet the suggestions of certain provinces, and the Executive stands ready, when desired, to meet with any provincial committee on Federation in order to iron out any difficulties. The most troublesome matter, still left unsolved, is that of the payment to the National Association in the case of those who, in their provincial relations, pay a composite fee to cover the dues of their provincial societies and those of their licensing body. No doubt, a satisfactory solution will be found. It would appear probable that complete, or nearly complete, federation will be achieved at the next annual meeting.

The Report of the Committee on Economics deserves special attention, as the situation in regard to health insurance and the medical care of indigents in Alberta, British Columbia, Manitoba, and Ontario is set forth in some detail. The view is reaffirmed that it is desirable that a Royal Commission be appointed to fully explore the question of a Federal scheme for health insurance.

The report of the Study Committee on Cancer is an imposing document, speaking volumes for the zeal and industry of its chairman, Dr. J. S. McEachern. It records the progress made by this committee from its establishment in November, 1931, to March, 1937. Every step of the road is charted. It is gratifying to be able to state that the Board of Trustees of the King George V Silver Jubilee Cancer Fund for Canada has given a grant to the Canadian Medical Association of $14,000 a year, which grant has been accepted. This entails on our Association the duty of carrying out a program of education of medical men and laity in regard to cancer and the formation of a national society for the control of cancer. At the meeting of the incoming Executive Committee, held on June 24th, the implementing of these two mandates was delegated to the Committee on Cancer, with power to act.

The report of the Committee on Maternal Welfare, of which Dr. J. D. McQueen is chairman, also maps out an elaborate and carefully worked-out plan. It lays down in great detail rules for obstetrical practice for large and for small hospitals. The hope, of course, is that the adoption, so far as circumstances permit, of definite rules and procedures in our hospitals will help to lessen maternal mortality, which, as we know, is higher for the country as a whole than it should be. This report is to be sent to the Canadian Hospital Council for consideration. If the suggestions of the Committee be generally, or even largely, adopted by the hospitals it is felt that a great step forward will have been taken.

The question of the examination and registration of specialists was thought by our Association to be one that could properly be considered by the College of Physicians and Surgeons of Canada and has been referred to this body. The College has accepted the duty and is now considering what rules and regulations are to be adopted in connection with what all consider to be a very important matter.

A consummation much to be desired is that one common examination be established whereby a medical student may receive his license to practise at the same time that he obtains his degree from his university. There are certain practical difficulties in the way here, and this matter was referred back to the Committee on Medical Education for further study.

The problem of Intern Education and Supervision was considered also by the Committee on Medical Education, in collaboration with the Committee on Medical Education of the Ontario Medical Association and our Association's De-

partment of Hospital Service. The subject is treated at great length and from all angles, and the report will repay study by universities, hospitals, medical staffs, and the interns themselves. The matter is very intricate and the report was referred back to the Committee for further study.

The Code of Ethics presented for consideration in the Supplement was the last and cherished task of our late deeply lamented colleague, Dr. D. A. Stewart, of Ninette. As one would expect the Code is conceived on a high plane, is expressed charmingly, and exhibits everywhere its author's wide sympathy and learning. It should be read, if only to give a glimpse into the character of the man. In view of the importance of the subject the Code was referred back to the Committee, of which Dr. Ross Mitchell, of Winnipeg, is now chairman, for further consideration.

Do not fail to read the Supplement. It affords a sound argument in favour of union in the profession. A.G.N.

The Restoration of Ewelme Church

The friends in Canada of the late Sir William Osler, and they are many, will be interested in the appeal which is being made for funds to restore the ancient church at Ewelme, near Oxford. In his capacity as Regius Professor of Physic at Oxford Osler was Master of the Almshouse at Ewelme, and during his frequent visits to that village made himself greatly beloved. A handsome memorial to him has been placed in the church. One important thing that he did was to save for future time a large number of deeds and records pertaining to the Manor which had been placed in a safe in the muniment room and forgotten for twenty-five years. These papers were in a shocking condition from dampness and mould. They were dried and renovated and handsomely bound, seals and all, and were placed in a modern safe in a room which was kept properly dry. The collection dates back to the twelfth century and contains material of extraordinary interest.

We are privileged to reproduce a letter sent to the London *Times* by the rector of Ewelme which is sufficiently explanatory of the situation, and, besides, contains much historical information of entrancing interest. The letter reads as follows.

Sir— Will you allow me to make an appeal in your columns on behalf of Ewelme Church? The whole of its roof has been so severely damaged by the death watch beetle that immediate restoration is essential. Our architect estimates that we shall need about £3,500 to do this properly. We are a small community of 469 people. We till the land and grow watercress for a living. From the village and neighbourhood sums have been received which, with a grant from the diocese, amount to £680. To raise the remainder a much wider appeal is necessary.

Ewelme is remembered by most people for its own natural charm and for the group of buildings comprising the school, almshouse ("for 13 poor men"), and church, which form a combination unique of its kind in the unity and completeness of the whole and in the beauty of its setting.

Begun in the year 1432, it was completed and endowed by William De La Pole, first Duke of Suffolk, and Alice, his wife. She was the daughter of Thomas Chaucer, son of Geoffrey Chaucer, the poet, and widow of the Earl of Salisbury, Commander-in-Chief of the Army in France, who was killed at the siege of Orleans in 1428. She had thus married successively two of the most distinguished Englishmen of the time. Thomas Chaucer came into possession of the Manor of Ewelme at the end of the 14th century. He fought at Agincourt, taking with him to France men from Ewelme. Member of Parliament for Oxfordshire, several times Speaker of the House of Commons, Ambassador to France, negotiator of the treaty of Troyes, he held high office under Richard II, Henry IV, and Henry V.

Ewelme is thus intimately connected with the fortunes of the Chaucer and ill-fated Suffolk families. The first Duke of Suffolk was murdered at the instigation of his political opponents. The second Duke, John, married Elizabeth Plantagenet, sister of Edward IV, and so the descendants of the poet Chaucer had risen to be princes, and one of them, John, Earl of Lincoln, was actually named as heir to the throne by Richard III. He and his two brothers all met with violent deaths, and with them the male line of the De La Poles became extinct. In 1605 James I united the Rectory of Ewelme to the Regius Professorship of Divinity at Oxford and the Master of the Almshouse to the Regius Professor of Medicine. The former arrangement came to an end in 1872; the latter still exists.

Among the treasures of the church are: The well-known beautiful alabaster tomb of Alice, first Duchess of Suffolk, "a monument as fine in taste and as masterly in execution as any of our alabaster works", and of great interest nationally because it is in all probability a product of the school of sculpture that flourished at Nottingham during the 15th century; the tomb of Thomas Chaucer with its twenty-four shields and two perfect brasses; the oak and chestnut roof of the chapel decorated with many carved figures of winged angels and the Sacred Monogram; the lofty and elaborate font cover, said to be the earliest of its kind; the screen; sixteen ancient brasses dating from 1434; and a number of smaller objects of archæological interest. All these have been well cared for for five hundred years. Of these we are the present custodians, and we ask for financial help to ensure their safety by restoration to its former soundness of the roof of the sacred building which houses them. We still want about £2,800. Our appeal has the approval of the Bishop of Oxford.

I shall be glad to receive and acknowledge any contribution that may be sent to me.

A. T. HUMPHREYS,
Rector of Ewelme.

The *Journal* has pleasure in endorsing this appeal and commends it to the favourable notice of our membership. Subscriptions, great or small, will be welcome, and may be sent either to the Rev. A. T. Humphreys, Rector of Ewelme, Oxford, England, or to Dr. W. W. Francis, Osler Library, Medical Faculty, McGill University, Montreal. A.G.N.

Special Articles

SOME IMPRESSIONS OF A GYNÆCOLOGIST IN POST-WAR EUROPE*

BY SIR BECKWITH WHITEHOUSE, M.S.(LOND.), CH.M.(B'HAM.), F.R.C.S.(ENG.), F.C.O.G., F.A.C.S.(HON.)

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To speak to the medical profession of the Dominion of Canada is an honour of which I am deeply sensible. May I thank you, therefore, in most sincere terms for the invitation to address this general session of our Association.

The science and art of medicine have their own special problems, only to be solved by work and observation in the laboratory, operating theatre, or at the bed-side. The means to this end and the application of the practical results which accrue differ widely, however, as the result of environmental or economic factors, and a study of local variations and progress is always of interest to the onlooker.

In this Dominion you have your own difficulties inherent to the vast areas in which you practise. Accustomed as we are in the Old Country to limited distances, we, at home, cannot conceive, for instance, how medical, surgical or obstetric aid can be brought to the log-cabin or small township over here when skilled help is most urgently needed.

In England, Scotland and Ireland, medical problems are not essentially of a geographical nature, owing to the development of the cottage hospital and the utilization of the large teaching hospitals as bases for difficult and complicated cases. With us, perhaps the most important discussion today is the relation between so-called voluntary hospitals and the municipal or state institutions, a problem now almost peculiar to Great Britain and to which I shall refer again later. On the continent of Europe other post-war difficulties have had to be faced by the medical profession, as the result of both political and economic influences, which have left their stamp not only upon technique but also upon personnel. In recent years it has been interesting to visit various clinics in Europe, and today I propose as a gynæcologist to tell you something of my impressions of these centres, and of the men whom it has been my privilege to meet.

In 1922 I had the opportunity of going to Brussels and seeing the work of the late Professor Dépage at the Hôpital St. Pierre. Dépage was the senior general surgeon in Belgium during the War, and was responsible for the medical organization of the Belgian army. The hospital where I saw him working was a large institution, rather of the type associated by us with the name "infirmary", but not so well furnished and equipped as similar state institutions in England. The main operating theatre was a large room where two operations were performed simultaneously. Each operating team was literally roped off, and visitors, of whom there appeared to be many, strolled about outside the operating "pens". Whilst Dépage performed a gastro-enterostomy, his first assistant at an adjoining table removed a tuberculous appendix. I remember that Dépage was very annoyed because this assistant did not transplant the ovaries in his patient for our edification. The indication for transplantation of the ovaries I failed to understand, and I mention the incident to illustrate what I have noted in other continental clinics, *viz.*, the exaltation of the science and art of surgery in some of these institutions to the detriment of the best interests of the patient. In our commonwealth I think we may say that the patient's welfare *always* comes first, and that science is a servant and not a master. Long may it remain so!

Another point that impressed me in Brussels, was the age of the assistants. Not only the first but also the second and third assistants in the Dépage Clinic were all very senior men, not only willing but proud to work for one whom they regarded as a great master. The remuneration of these men was small, a few hundreds a year. Most of them were also attached to hospitals in outlying areas, at Louvain, for instance; but their duties at the great Central Clinic appeared to be so onerous and exacting as to preclude much work elsewhere of a private or lucrative nature. The general impression I gained of Belgian surgery was that the technique is good, but that there is, or rather was, a tendency to strain after the spectacular.

The private hospitals and clinics were very good, but the public institutions did not attain to the comfort and equipment which we are accustomed to associate with our leading hospitals. My visit to Belgium was soon after the War, and the remains of the German occupation were still very much in evidence. During the years that have since passed, it is, therefore,

* Read before the Canadian Medical Association, at Ottawa, June 23, 1937.

probable that the hospitals of Brussels have undergone radical changes.

In 1930 I paid a visit to Denmark and Sweden with the Gynæcological Visiting Society of Great Britain. Our destination was primarily Professor Gammeltoft's Clinic at Copenhagen, Professor Essen Möller's Clinic at Lund, and the Radium-Hemmet at Stockholm. Let me tell you, in the first place, something about Gammeltoft. Some of you may have met him. If so, you will know the gifts with which he was endowed, his delightful and charming personality which made a brief acquaintance appear at once like a life-long friendship, his excessive keenness, his technical skill, his art as a teacher, and also that nervous energy which placed him so much above his fellows, but which terminated his medical career in such a sad and tragic manner. Gammeltoft lived in a house next door to his hospital, and took a very active part in the practical training of his students in obstetrics. He regarded his duties very seriously, and was on constant duty day and night. His was a whole-time Chair, with a remuneration of about £1,000 a year, and his house. One could not fail but be impressed with the difference in the *practical* obstetric training of Danish medical students and those in the British schools, where the teachers are part-time, and have other interests. In recent years the training of medical students in Great Britain in the science and art of obstetrics has undergone very considerable revision. A longer period in the curriculum is now devoted to the subject, and each student has to spend a period of one to three months actually in residence in a maternity hospital before he is allowed to work on the "extern" districts. I still believe, however, that the teaching of our students in this very important part of their training will not be complete until the *senior* teachers themselves reside in the maternity hospitals and actually teach *practical* obstetrics. So often with us, indeed I think I may say almost universally, does it happen that the practical teaching and demonstration of midwifery upon the living subject is in the hands of junior men or women actually themselves learning their art.

The conscientious training of students in midwifery is an exhausting ordeal, as in the nature of things it cannot be regulated by the clock. It follows, therefore, that the physical and mental strain should not be too long endured. Neglect of this important consideration can only lead to nervous wreckage with the results shown in the case of the brilliant holder of the Copenhagen Chair.

Denmark, like Sweden, is not a large country, but the population is scattered. It is sometimes difficult, therefore, to obtain medical assistance immediately during obstetric emergencies. To meet this, the midwives are trained, and are expected to perform, when necessary, such operations as version, low forceps, manual removal of the placenta, and the repair of minor perineal tears. Needless to say, the training of Danish midwives is very thorough. It is in the hands of a professor who has no other responsibilities. The Midwives' Training School is entirely separate from that of the medical students, and the appointment and remuneration of the whole-time professor and his assistants are responsibilities of the Danish Government.

The new Midwives' Act may eventually lead to the adoption of separate clinics for midwives and medical students in England. I sometimes wonder whether this is a good thing; but perhaps I am tinctured with the views of my old teacher—Dr. John Fairbairn. He was, and I presume still is, a strong believer in teaching the medical student and the pupil midwife in the same class. They will work together afterwards, and so why not let them start together, was his dictum.

After leaving Copenhagen my next destination was the old university town of Lund in Sweden, where the Gynæcological Clinic was presided over by Professor Essen Möller. Essen Möller, then approaching the time of his retirement, was still in the very first rank of the exponents of abdomino-pelvic surgery, and I shall ever regard it as one of my great privileges to have had the opportunity of seeing this artist at work in his own clinic. I have witnessed many operations in many clinics, but never have I been so impressed as I was on that June morning in Lund. Essen Möller's reputation as one of the greatest of European surgeons was amply upheld by the beauty of the technique that he displayed before us. He performed three operations, two hysterectomies and an ovariotomy. The Professor and his assistants sat whilst opening and closing the abdomen, a point which typified the unhurried orderliness of the whole procedure. Essen Möller worked with a simplicity, gentleness, and sureness that made an immediate appeal to everyone present, and during the whole of the operations there was complete silence. It was interesting to note that his anæsthetist was a nurse. Also that whenever he spoke English was the language he employed; and everybody in that theatre understood it as well! Commenting upon this fact later, Essen Möller told me that as far as they were able he and his staff always endeavoured to respect the language of their visitors—a delicate compliment which unfortunately is not possible for all of us to return. The Professor was ably supported by Dr. Wachenfeld, who now occupies a professorial Chair himself. Wachenfeld was a first-class assistant, and when I remember him, I think of the abdominal retractor which was hooked to a belt surrounding his ample waist.

The contractions of his abdominal muscles served as a very good substitute for a third hand!

After operating, Essen Möller showed us over a part of the hospital, a simple, airy, and spotlessly clean institution, with plenty of room and with flowers everywhere. An adjunct that appealed to me were the large public rooms for convalescent patients. These resembled comfortable lounges which one is accustomed to associate with a luxurious hotel. No British hospital that I know is provided with public rooms where the convalescents can gather; but perhaps we do not keep our patients in hospital long enough to require such accommodation!

From Lund I proceeded to Stockholm, one object being to ascertain if possible, the factors associated with the low maternal morbidity which place Sweden and Holland in a very enviable position in Europe. The state lying-in hospital in this northern Venice is called the "Allmanna Barnbordshust"—popularly abbreviated to the "A.B.B."—not the "B.B.A."!

In Stockholm 94 per cent of all confinements take place in hospital, and throughout the whole of Sweden, the number of maternity patients admitted to hospital is increasing. There is little domiciliary midwifery, and for the same reason very little "private" midwifery. It is practically a state problem from beginning to end. The state-trained midwives are distributed on a geographical basis, and air transport is provided by the Government for midwives who officiate in the far north, *e.g.*, Lapland. I was interested, a few years later, to hear from Professor Marshall Allen in Melbourne, that he has instituted a very thorough aeroplane obstetric service to overcome the geographical difficulties associated with the practise of midwifery in the Australian bush.

No complicated obstetric problem is ever dealt with in Sweden outside the walls of a hospital, and, therefore, the work of the midwives is practically confined to diagnosis and conduct of the normal case. It is interesting to note that occipito-posterior presentations are regarded as being normal, unless, and until, impaction occurs from non-rotation of the fetal head. Incidentally, I noted that the forceps rate in the clinic of Professor Bovin, the head of the Municipal Lying-in Hospital, was 3.7 per cent, and only three Cæsarean sections had been performed in a consecutive series of 2,434 cases. Contracted pelvis is practically unknown in Sweden, and this fact, associated with careful institutional treatment conducted by a staff of midwives and doctors specially trained for the service over a long period no doubt determine the low mortality rate.

An interesting point regarding statistics, ascertained by Professors James Young and Miles Phillips, is that in some medical centres of Europe the material upon which figures are based is not identical with that of other centres with which comparison is made. For example, in Holland, deaths from toxæmia and eclampsia are regarded as medical and not obstetrical items, and, therefore, are omitted from statistics which provide the figures of maternal mortality!

It is rather a long step from the northern capitals to Central Europe, but I think, perhaps, you may be interested in a visit that I paid to Vienna and Budapest in the spring of 1935. Both Austria and Hungary have passed through a very difficult time, both politically and economically, since the War, and at the period of which I speak, both these centres were only just commencing to feel their feet once more. In the political instability which existed, the science of medicine had suffered. There was talk of Chairs being discontinued, and departments being closed down. Medical practitioners of all grades had felt the financial pinch, and expenses, both departmental and personal, had to be ruthlessly cut. There is good reason to believe now, however, that the corner has been turned and, in the absence of further upheavals, that the great medical centre of Vienna may once more rise to eminence, and reoccupy the position in Europe from which it has been deposed by the force of circumstances.

It is interesting to study the result of the adverse factors which I have mentioned upon the medical work of Vienna. In the first place, there is no doubt that during recent years many of the holders of professional Chairs and Lectureships have felt a sense of insecurity in the tenure of their offices. The same political influences which have led to the departure of Aschheim and other great scientists from Germany, have been feared in Austria. It is to be hoped that these fears are groundless, for the reorganization of clinics which might be associated with a new régime, accompanied by the uprooting of teachers whose heart and soul are not only in their departments but in Vienna itself would be a disaster of great magnitude. Amongst gynæcologists today the names of Oskar Frankl, Adler, Schiller, Wernher, Kahr and Halban mean so much that one cannot imagine the Vienna School bereft of the personality of these teachers and artists.

Vienna has long been the home of vaginal hysterectomy, and since the War the popularity of the vaginal, as opposed to the abdominal route of approach, has, if anything, increased. Professor Adler told me that one reason for the preference of the Viennese gynæcological surgeon for the vaginal route, was the fact that

the operation required very little in the way of suture materials, and that the patient was soon out of hospital. Adler's patients get out of bed on the fourth day and the majority go home on the tenth. It is, therefore, a very economical operation — an important point these days — quite apart from other more obvious advantages. Whilst in Vienna, I had the opportunity of seeing this operation performed by various surgeons and for various indications, and there is no doubt that the Viennese School are masters of vaginal technique. Professor Adler in his clinic performed a radical operation for carcinoma of the cervix uteri per vaginam under local anæsthesia. Access was obtained by means of a para-vaginal or Suchardt's incision, and the uterus was removed with a large amount of para-cervical tissue. No attempt was made, however, to remove the lymphatic glands, these being dealt with by means of radium in a container placed against each lateral pelvic wall at the end of the operation. The local analgesia, absence of bleeding, and excellent condition of the patient at the end of the operation were very impressive, as also was the wonderful team-work on the part of all concerned in the theatre.

In most clinics I visited there appeared to be a superabundance of assistants, able to provide just the right kind of assistance at the right time. That an army of such trained assistants is, however, not an essential, was ably demonstrated in the case of vaginal hysterectomies performed by Professor Kahr and Professor Wernher. I do not think that I am exaggerating when I say that both these surgeons are past-masters in the art of vaginal hysterectomy. Kahr works in the old Allgemeines Krankenhaus, forever associated with the name of Semmelweiss, and, for historical reasons, still practically the same as when the Semmelweiss trod its floors. I saw Kahr perform two vaginal hysterectomies. The operations were carried out without difficulty or hurry, and with a clear demonstration of all the steps. In less than half an hour both patients were anæsthetized, operated upon, and returned to the ward! Professor Wernher is an equally skilful exponent of the operation, and his dexterity is outstanding.

What did not impress me in Vienna were the methods adopted in two well known clinics for the surgical treatment of uterine and vaginal prolapse. This is rather surprising when one reflects that the basis of our modern vaginal methods for dealing with prolapse originated in Vienna. Both radical colpoplasty and utero-vesical interposition are Viennese operations, which in their time were valuable contributions to the therapeutics of prolapse.

Pathology, I am glad to say, still lives up to its very high tradition in Vienna, and I know of no better place where gynæcological pathology can be studied. Oskar Frankl's work is, of course, well known, and I am glad that he is once again restored to surroundings where his work and teaching can be carried on in accordance with those principles which are so dear to his heart. Nothing, I think, demonstrates the true artist in Frankl better than the beautiful models which he uses in his teaching, all designed by him, and made by his own hands. Another remarkable personality amongst the gynæcological pathologists is Walter Schiller. It is probable that some of you have met him, as the last letter I received from him was from New York. If so, you will know something about his enthusiasm and gift of stimulating a like enthusiasm in his audience. One late afternoon in Vienna, he discoursed to us upon his researches into ovarian pathology for three hours, and then took us off to the opera, where we interspersed the acts of "Die Fledermaus" with snacks of dinner. Yes, Walter Schiller is a remarkable man. Not only is he a pathologist, a musician, and an entomologist, but he reads ancient Greek for recreation in the moments he can snatch from his scientific researches!

I am not qualified to discourse upon personalities who figure prominently in Vienna in other branches of medicine and surgery. They are there, and will fully maintain the old tradition of Vienna, if, as I have said before, medicine can be left outside the political arena, and its exponents allowed to continue their researches and teaching in peace for the good of science and humanity.

Vienna is within a few hours of Budapest, but the latter is entirely a different city, with contrasts at every turn. When I visited it in 1935 it appeared, certainly on the surface, to have weathered the storm better than Vienna, and to be making material progress towards recovery. The influence of politics was, however, still evident in the large floral map in the centre of the city, with the detached portions of the country clearly shown. This map is planted each year by the women of the city. The same influence is shown in the prayer for the restoration of Hungary, recited by all students at the university in each faculty before the first morning lecture of the day.

Budapest has an excellent medical school, with modern buildings and a good post-graduate organization. Here, as in Vienna, most gynæcological operations appear to be performed under local analgesia. I saw Professor Frigeysi, the chief of Gynæcological Clinic No. 1, perform a sub-total hysterectomy, an interposition operation for prolapse, and a curettage, all under local analgesia, and this appeared to be entirely satisfactory. Post-graduate students act as assistants in the professorial unit, and I was

impressed with the very moderate charges made for maintenance.

Research into tissue extracts and hormones occupies a prominent place in the university laboratories at Budapest, and useful work is being done there. I was interested in a method in process of elaboration, of providing temporary sterility, possibly stimulated by the proximity of Moscow!

In the time that is left I should like to say something about Holland in connection with the development of its maternity services. Holland is, of course, a small country, and this, associated with the fact that all parts are easily accessible, has led to an extremely satisfactory organization. A factor in the low maternal morbidity is undoubtedly to be found in the mentality of the women themselves. The Dutch woman is not obsessed with the element of fear which, in recent years, has dominated the women of many western countries, largely the result of being repeatedly told on platform and in newspaper that child-bearing is a risky luxury, and that she will be lucky if she gets away with it! Further, Dutch women will not have chloroform, or any other anæsthetic or analgesic for their confinement if they can avoid it. They regard it as a grave reflection upon their pluck, and if it should be necessary, I am told that they are particularly careful to say nothing about the incident when they return home to their villages! Then again, the development of the organization known as the Dutch "Green Cross" is doing excellent work in areas remote from the cities. The head of this voluntary organization is Dr. Bergemann, and it provides infant welfare, pre-natal and post-natal care in nearly every village in Holland. The local midwife resides in a small comfortable house, especially built for the purpose, which not only provides accommodation for her, but also includes an out-patient department where her patients are seen and examined. Here also, public health, social hygiene, and home nursing are taught. Medical supervision is provided from the nearest city.

The midwife in Holland is a very important member of the community, and not only her training but also her subsequent duties are carefully supervised by the State. There are no "free-lance" midwives; they all belong to a national service. Admission to this service is by examination which is competitive, since only a certain number of vacancies created by death, resignation, or age, are available each year. The training of the Dutch midwife is very thorough and occupies three years. In the first instance she must pass an examination to show her proficiency in subjects of general education, including a language other than her own. An accepted pupil is taught during her first year such subjects as anatomy, physiology, chemistry and physics, attending daily lectures on all these subjects. Subsequently she receives a very thorough training in midwifery, both theoretical and practical. Finally, she is dispatched as a *locum* to one of the practising midwives in Holland, whilst the latter returns to her training school for a compulsory post-graduate course every three years. This very excellent arrangement not only provides opportunities for the young midwife to assume sole responsibility, but prevents older women from becoming "stale", and too soaked in routine. The training school for midwives that I personally visited is in Rotterdam. It was under the charge of Dr. Wesselink, and is well worth a visit by those interested in the development of maternity services.

Holland has, however, places of medical interest other than obstetric. Particularly would I draw your attention to the Physiology Clinic of Professor Noyons at Utrecht, and the new Laboratory of Pathological Anatomy of Professor de Vries at Amsterdam. The latter is a very fine building, modern in design, and equipped with every possible gadget for teaching and research in pathology. The post-mortem room, with its spotlessly clean amethyst-coloured tables, each fitted with a large scialytic light, is probably the most luxurious apartment of its kind in Europe. To study pathology in Amsterdam is not only to study a science but indeed an art.

And now to return home, my home; what are the general impressions I gained after these various journeys? In the first place, I think I may honestly say that my faith in the British general practitioner as an integral part of medical practice was never higher than it is to-day. On the continent of Europe the general practitioner, as we know him, does not exist. There are any number of specialists and quasi-specialists, young and old, some doing good work, others doing bad; some making a success of life; others undoubtedly living from hand to mouth. But there are few, if any, of those highly respected members of our profession such as we associate in Britain with the best type of family practice. I refer to the doctor who is valued not only for his medical skill but also for his sound advice as a man of experience and a man of the world conversant with every aspect of human life. There is a danger that the British family practitioner may in the future have no place in the medical work of the community. With the multiplicity of clinics established by the State, and the development of what are termed "contributory schemes", the family practitioner of the future may find himself with nothing to do, and be compelled to accept a salaried State office! Fevers, tuberculosis, venereal diseases, diseases of children, ante-natal maternal care, and even contraception, are already largely State-controlled. Specialist hospital services in association with contributory

schemes will soon complete the work, and the British public may one day wake up to discover that they have been "nationalized" in matters medical, and that the family practitioner is no more. Perhaps they will then appreciate what they have lost!

The depletion of work of the family practitioner has naturally led him to adopt other activities, and already we find the development of what may be termed a "sub-specialist" group. Men and women, whilst engaging in general practice, also act as local consultants in various specialist subdivisions of medicine. There is, without doubt, a place for work of this type, especially in country towns and centres of population which cannot support the "pukka" consultant. At the same time there is a real danger, especially in surgery, of general practitioners taking on responsibilities for which neither their training nor their experience fits them. This is a problem which will have to be faced by us in the future, for the lay public is astonishingly well informed these days in medical matters. Although they support and apparently even like the unqualified medical practitioner, they expect only the best from us and are ruthless when their faith in us is displaced.

In midwifery, our British College of Obstetrics and Gynæcology, is endeavouring, by means of its Diploma in Obstetrics, and by its membership, to provide for the public of the British Commonwealth a service staffed by men and women who have proved their fitness to accept the responsibilities of the work which they profess. We hope and expect that in the course of time, the Diplomates will act in their area as local consultants in obstetric difficulties. Similarly, the Members and Fellows of the College will be universally recognized as specialists in the science and art, both of obstetrics and gynæcology, capable of dealing efficiently with any difficulties which may arise.

Another matter on which I hold very decided views is the importance of maintaining in Great Britain our great voluntary hospitals. They are almost as much an institution with us as Parliament itself. There is something about a voluntary hospital which is absent from the municipal or state institution. What it is is difficult to put into words. Perhaps it is best expressed by saying that a person admitted to a voluntary hospital, is a "patient", rather than, or in addition to, being "a case".

I cannot imagine in one of our British voluntary hospitals such things happening as transplantation of the ovaries purely as a surgical "side-show", the removal of a uterus through an abnormally long abdominal incision so that surgeons at the back of the auditorium might obtain a good view of the technique, or the addition of maternal urine to babies' milk to prove the assumption that the addition of sex hormone is beneficial to the weight curve! All these things I personally have seen in various clinics whilst making mental notes at state hospitals on the continent of Europe. So long as the family practitioner survives and is supported by the great voluntary hospitals with their healthy staff rivalry and competition such incidents are not likely to occur in Britain.

A fixed salary with us is regarded as a dead-end, and this is the reason why young medical men leave the municipal hospitals and apply for vacant appointments in the voluntary institutions where the rewards of success are commonly regarded as unlimited. Even if this is not true, I think that the average British medical temperament prefers the stimulus of a potential gamble on his own resources rather than the safety of a State salaried post!

Many other problems there are that are exercising European minds today, but I must not exhaust your patience. The increasing ravages of cancer in Europe, especially in women; the steadily falling birth-rate; the menace of abortion, illegal and otherwise, both in its influence upon the health of the people, their moral standards, and the population; the increase of contraception since the War amongst all classes, but particularly amongst the educated and leisured classes, are all matters that are troubling us at the present time. Perhaps, in this great Dominion, with its untold possibilities, you are free from such sordid matters as some of those which I have mentioned. I hope so, sincerely. I like to think of you in Canada developing on lines of moral, physical, and mental progress, free from those false principles which in all civilizations have appeared when unhealthy factors arise in the crowded community.

Hospital Service Department Notes

The Intern Who is Dissatisfied

BY HARVEY AGNEW, M.D., F.A.C.H.A.

Secretary, Department of Hospital Service, Canadian Medical Association, Toronto

Internship services have never been so well organized in Canada as at the present time; interns have never been given such an opportunity to gain experience, to profit by staff interest and cooperation, to have good housing, good food, and recreational facilities, yet definite dissatisfaction and unrest does appear here and there. In some hospitals interns are demanding more practical work, particularly in

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, 184 College Street, Toronto.

surgery, than has been considered advisable by the staff; in another, interns are asking to have alternate week-ends off; when interns have been released for unprofessional conduct, the others have threatened to leave also, and, in one instance, did so. Higher honoraria have been demanded. The strike of the interns in certain French Canadian hospitals a couple of years ago is well remembered.

The tendency to demand certain privileges beyond those usually associated with the position of intern may be due to several reasons. In certain instances the interns may be unfairly treated. Medical staffs must take a personal interest in the welfare of these recent graduates, and cannot expect them to maintain a high morale, doing nothing but histories and urinalyses. But such conditions are rapidly disappearing. If anything, interns are being given too much freedom with the scalpel or the obstetrical forceps in the first year of their internships, and obtain a false impression of the respect needed for major procedures. In some instances a lack of appreciation of the ethics of medicine has brought individuals to grief, and a mistaken sense of loyalty to a comrade on the part of others may have dwarfed the greater responsibility to uphold the traditional honour of the medical profession. Perhaps this assertion of "rights" may be but part of a general trend towards the casting-off of discipline and authority and an insistence upon group-privilege so generally prevalent today. Interns may be emboldened in this attitude by the fact that the demand for interns exceeds the available supply.

While certain resignations may be warranted when the medical staff members have not played fair with their junior colleagues, there are other ways of handling this situation than by abruptly breaking a contract. A frank conference with the intern committee, or, if necessary, with the heads of services should clarify the situation tremendously. Moreover, the contract to perform the duties of internship implies a moral obligation to the patients of that hospital which cannot, in the light of professional ethics, be lightly ignored. It would appear that altogether too many final year students and recent graduates fail to appreciate their obligations to others. All too frequently a young man, accepted by a hospital, fails to notify such hospital that he has accepted an appointment in another hospital to which he may have also made application. Such is unmitigated discourtesy and may cause real difficulties for the hospital not so notified. Interns must realize also that *they* profit by the internship far more than the hospital or its medical staff. Doctors would far sooner have a highly trained nurse assistant, thoroughly acquainted with their techniques and routines, than a never ceasing, constantly changing, stream of green interns, each of whom must be individually and laboriously taught the fine art of unified action and thought. The maintenance of interns, the added demands upon the nursing service, and the honoraria, even though modest, if at all, add considerably to hospital costs. Medical staffs state that they may be forced, if difficulties continue, to safeguard their services by supplanting the uncertain intern supply with trained nurses, ward clerks and other assistants.

Interns not satisfied with their treatment are free to, and do, correspond with the Committee on Approval of the Canadian Medical Association. Intern committees of the medical staffs, or the hospital superintendents, now report to the Committee those interns or applicants whose actions have occasioned disapproval. Interns cannot lightly flit from one position to another, appointment committees having learned to view with some caution applications received in mid-season. Rather than risk an intern known to have created trouble elsewhere intern committees have frequently preferred to complete the year shorthanded. At the same time several instances have arisen in the past few months wherein applicants have proved to the intern committee of the second hospital the validity of their complaints and have been accepted for internship.

Increased Provision for Convalescent Care in Canada

The recent announcement that the Quebec government is to contribute $200,000 towards the expansion of the Montreal Convalescent Hospital is tangible evidence of the importance of this type of care. It is only a few years since this hospital was moved to its present site and expanded to a capacity of 103 beds. For some time it has been not only taxed to capacity but actually exceeded by many patients its rated capacity. It is now proposed to expend some $400,000 in erecting a new five-storey addition, which will double its present capacity. The additional funds are being raised by private and public subscription.

In the same week the new St. John's Convalescent Hospital at Newtonbrook, near Toronto, was officially opened by His Excellency, the Governor-General of Canada. This fine new institution of 67 beds is located on a beautiful twenty-one acre, partially wooded site, and is being operated by the Sisters of St. John the Divine (Anglican). The medical staff is made up of representatives of all of the public hospitals in the City of Toronto. The operation of this and other convalescent hospitals in the Province of Ontario is considerably aided by the hospital legislation, which has authorized a provincial grant of 40c. per diem for each public ward patient, and a municipal payment of $1.25 per diem for all non-pay patients in approved convalescent hospitals.

Provincial Association Notes

The New Brunswick Medical Society

The fifty-seventh Annual Meeting of the New Brunswick Medical Society was held this year in Moncton. The entertainment program and all details for this most successful meeting were arranged for by a committee of the Moncton Medical Society, who acted as hosts to the provincial society. This resulted in one of the finest meetings enjoyed by the New Brunswick Medical Society for many years. A welcome was extended by Mayor McMonagle on behalf of the city, and by Dr. R. D. Roach, on behalf of the Moncton Medical Society. Dr. A. L. Gerow, President of the Society, presided at all meetings, both business and scientific.

The report of the Registrar, Dr. J. M. Barry, made reference to the attempt of the chiropractors to put through a bill of the last meeting of the Legislature, to provide the legal registration of chiropractors. Action on this bill had been deferred, but Dr. Barry stressed the necessity of a thorough study of the chiropractor situation, and at this meeting a strong committee was appointed for this purpose. This committee represents the Council of Physicians and Surgeons, the New Brunswick Medical Society, and the profession at large.

The Executive Committee reported a large amount of useful work done since the last meeting of the Society, and in this report it was recommended that a new schedule of fees as proposed by the New Brunswick Workmen's Compensation Board be approved. The schedule of fees, which was approved, contains some new features, but it is felt that on the whole it may work out as an improvement on the old schedule. The executive also recommended that every practising physician in New Brunswick should become a member of the Canadian Medical Protective Association. The election of officers for the year 1937 and 1938 resulted as follows: *President,* Dr. J. R. Nugent, Saint John; *1st Vice-president,* Dr. W. E. Gray, Milltown; *2nd Vice-president,* Dr. R. M. Pendrigh, Saint John; *Treasurer,* Dr. F. C. Jennings, Saint John; *Secretary,* Dr. A. S. Kirkland, Saint John. *Additional members of the Executive*: Drs. A. E. Macaulay, Saint John; A. F. VanWart, Fredericton; J. F. L. Brown, Woodstock; H. S. Everett, St. Croix; L. G. Pinault, North Shore; A. Sormany, Madawaska; Paul Atkinson, Moncton.

The Workmen's Compensation Board Buffer Committee was reappointed. It comprises Drs. R. A. Hughes, Joseph Tanzman, and O. B. Evans, all of Saint John.

The Cancer Committee was reappointed, to be composed of the President, Registrar of the Council, the Secretary, and, in addition, Drs. Britton, George Skinner, J. A. M. Bell.

The Golf Committee was reappointed, namely, Drs. Gray, W. Warwick, and E. C. Menzies.

Additional members to the Canadian Medical Association Council were elected as follows: Drs. R. W. L. Earle, C. J. Veniot, G. C. VanWart, W. E. Gray, A. L. Gerow, and P. H. Laporte. Five members were elected to the Council of Physicians and Surgeons of New Brunswick, as follows: Drs. H. E. Britton, R. W. L. Earle, P. H. Laporte, W. E. Gray, and A. S. Kirkland.

The second business session took the form of the Annual Luncheon, at which Dr. T. H. Leggett, president of the Canadian Medical Association and Dr. T. C. Routley, secretary of the Canadian Medical Association spoke on matters of national importance, chiefly on the subject of Federation. There was considerable discussion of Dr. Routley's address, and he was kind enough to answer a large number of questions from various members of the profession. Dr. A. L. Gerow, the retiring president, in an extemporaneous speech, discussed the business of the Society arising in the last year, and pointed out a number of avenues for new work in the coming year. This form of presidential address was given a very flattering reception. The scientific program consisted of seven papers, and, this year, it is difficult to over-emphasize the value of these papers; all were of sufficiently great interest to deserve a place on a national program. Dr. B. F. McNaughton, of Montreal, spoke on the subject "Plastic repair of the face"; Dr. Wm. P. Murphy, of Boston, discussed "Treatments of disease of the blood in general practice". This paper was illustrated by slides and motion picture films. Dr. Frank H. Lahey, of Boston, delivered an exhaustive discussion on "Combined treatment of peptic ulcer". This paper also, was illustrated by motion picture films. Dr. Howard F. Root, of Boston, read a paper on "Diabetes today". Dr. C. W. Holland, of Dalhousie University, Halifax, presented a paper on "Heart disease in pregnancy". Dr. Gordon Bauld, of Montreal, discussed "Carcinoma of the cervix". As an innovation, Mr. James Dever, barrister of Saint John, discussed the subject "Malpractice". This paper was received most handsomely by the physicians at the annual meeting, and it is the intention of the Society to circularize the entire profession with a copy. Each of the scientific papers was discussed by members of the local Society.

The VanWart Golf Trophy was won this year by Dr. Wm. Warwick. The presence of Dr. G. Clowes VanWart, donor of this trophy, was greeted by cheers. Dr. VanWart is one of the oldest members of the Society and has been

a life-long worker in its affairs. Last year he suffered a serious accident when his car was struck by a locomotive, and it was a pleasure to see that he was once more able to be about.

A. S. KIRKLAND

The Medical Society of Nova Scotia

The eighty-fourth Annual Meeting of the Medical Society of Nova Scotia was held at Pictou Lodge on July 7th and 8th, under the presidency of Dr. J. R. Corston, of Halifax. Deputy Mayor A. A. Gunn welcomed the members of the Society to Pictou. In his presidential address Dr. Corston expressed the desirability of an executive meeting between annual meetings and the importance of setting up a committee on medical economics to report to the Society. Dr. Allister Calder, of Glace Bay, was elected president for the next year. It has been decided to hold the next annual meeting at Halifax in June, 1938, in conjunction with the annual meeting of the Canadian Medical Association. Visitors to the meeting who read papers were the following: Dr. W. V. Cone, of Montreal, "The treatment of fracture dislocations of the cervical vertebræ by skeletal traction and fusion"; Dr. G. J. Wherrett, Ottawa, "The control of tuberculosis"; Dr. William P. Murphy, Peter Bent Brigham Hospital, Boston, Mass., "Problems of diseases of the blood in general practice".

Dr. L. M. Morton, of Yarmouth, was again successful in winning the golf tournament staged by the Society.

Medical Societies

Canadian Physiological Society

The third annual meeting of the Canadian Physiological Society was held at the Medical School, University of Western Ontario, London, on May 25th. There was an attendance of just over 100. Scientific and business sessions were held in the morning and afternoon. The Society was entertained at tea by the wives of the London members in the afternoon. The annual dinner was held in the Hotel London in the evening. After the dinner Professor B. P. Babkin addressed the Society on the subject "Recent advances in the physiology of gastric secretion".

The Council for 1937-38 was elected as follows:

President, Prof. C. H. Best, University of Toronto; *Secretary*, Prof. G. H. Ettinger, Queen's University; *Treasurer*, Prof. E. M. Watson, University of Western Ontario; *Councillors*, Prof. Antonio Barbeau, Université de Montréal; Prof. Roméo Blanchet, Université Laval, Québec; Prof. J. B. Collip, F.R.S., McGill University; Prof. Geo. Hunter, University of Alberta; Prof. H. Wasteneys, University of Toronto; Prof. E. Gordon Young, Dalhousie University.

Nine new members were elected to the Society, bringing the total membership up to 218. Steps were taken to obtain recognition as a national society by the International Physiological Congress Committee, so that members might be admitted to the International Congress to be held in Zurich in 1938. A committee was formed to consider the advisability of establishing a journal.

Twenty-two communications were presented. Abstracts of some of these are given below.

Complete reprints may be obtained from Dr. G. H. Ettinger, Queen's University, Kingston.

DISTURBANCES IN THE FUNCTION OF THE AUTONOMIC NERVOUS SYSTEM IN DOGS IN ADRENAL INSUFFICIENCY—C. W. J. Armstrong (by invitation), R. A. Cleghorn and G. A. McVicar, Department of Medicine, University of Toronto.

In 1914 Elliott demonstrated a paralysis of vaso-constrictor nerves in cats dying of adrenal insufficiency. This failure was due to a breakdown in the sympathetic effectors, since neither electrical stimulation nor nicotine produced material rises in blood pressure, and, though pituitrin and barium chloride were similarly ineffective, adrenalin still produced a substantial rise in blood pressure. This work we have confirmed and shown to be due to a failure of the sympathetic nerves to secrete "sympathin" in adrenal insufficiency. (In preparation for publication).

Parallel studies on the dog show a qualitatively similar picture in adrenal insufficiency. In this animal, prostrate from insufficiency and with a systolic blood pressure of 40 mm. of mercury, the sympathetic failure may be complete but is often much less marked than in the cat at apparently the same stage of insufficiency. A possible cause of the difference between the two species may be the occurrence in dogs of a terminal bradycardia, heart rates of 30 and 40 per minute being commonly met. We have considered the possibility that this may be a parasympathetic effect and in some instances, at least, atropine accelerates the slow rate. It is suggested that exhaustion of sympathin stores occurs in the heart, which results in the relative preponderance of the parasympathetic. This may or may not occur prior to the exhaustion of sympathin from the peripheral vascular system.

THE LEUCOCYTOSIS OF PARTURITION—Eldon M. Boyd, Department of Pharmacology, Queen's University, Kingston.

During the interval from the onset of labour until just before the administration of anæsthesia prior to delivery in women an increase occurs which averages 25 per cent in the white cell count. There is no consistent change in the differential leucocyte count. In 14 cases no significant change occurred in the lipid composition of the leucocytes during this period. It may be concluded that during parturition leucocytes are mobilized into the blood stream similar histologically and chemically to those already present and that these cells probably confer very little additional immunity.

EXPERIMENTAL PANCREATIC DIABETES IN THE MONKEY—J. B. Collip, H. Selye and A. Neufeld (by invitation), Department of Biochemistry, McGill University, Montreal.

The supposition that œstrin has a depressing action on the diabetogenic activity of the pituitary has not received confirmation by our experiments on the pan-

createctomized monkey. Both the œstrin-treated (1000γ daily subcutaneously) and the untreated pancreatectomized *Macaca mulatta* exhibited hyperglycæmia and glycosuria of approximately the same severity. Ketonuria was usually observed during the first few days following the operation, but disappeared later, irrespective of whether or not the animal had been treated. Unless complications set in (post-operative pneumonia was quite frequent) this species may survive pancreatectomy for several months without insulin treatment. During this period the animals consumed large quantities of food; but in spite of this they lost considerable weight, the severe atrophy of the muscular system being particularly striking. The changes in the carbohydrate metabolism following pancreatectomy in this species appear to be somewhat similar to those obtained by simultaneous pancreatectomy and adrenalectomy or pancreatectomy and hypophysectomy in animals such as the dog or the cat.

This became still more evident when we administered insulin to the fasted depancreatized monkey, for we found that it shows much more pronounced hypoglycæmia after the administration of this hormone than does the normal. Even without insulin treatment we observed the rather surprising fact that the blood-sugar of the depancreatized monkey, fasted for 34 to 70 hours, decreased to considerably lower levels (22 mg. per 100 c.c.) than that of normal controls fasted for the same period (50 to 60 mg. per 100 c.c.).

ON THE SYNTHESIS OF PURINES BY THE DOG—W. Allistar Crandall (by invitation) and E. Gordon Young, Department of Biochemistry, Dalhousie University, Halifax, N.S.

Diets high in their content of arginine have been contrasted with those high in histidine on the excretion of purines in young dogs. The level of dietary protein has been kept constant. Casein has been taken as the standard protein for comparison. Diets rich in histidine increased the excretion of uric acid 36-267 per cent and of allantoin 23-105 per cent. Diets rich in arginine decreased the excretion of uric acid 2-95 per cent and of allantoin 0-56 per cent.

Histidine is confirmed as the precursor of the purine nucleus for the dog.

GASTRIC SECRETION IN BIRDS—M. H. F. Friedman (by invitation), Department of Physiology, McGill University, Montreal.

Gastric juice was obtained from pigeons and chickens in acute experiments and from chickens with a permanent fistula of the proventriculus. Although in birds the acid and pepsin are both secreted from the same cell, histamine stimulates the secretion of acid only and not of pepsin. Acetylcholine and pilocarpine stimulate the secretion of acid and pepsin while adrenaline is without effect. The influence on gastric secretion of intravenous introduction of saline and glucose in various concentrations has been studied. Chemical analysis of pure gastric juice has been made. Chicken's gastric juice has a much higher peptic power than pigeon's juice.

ORGANIC LESIONS PRODUCED AS A RESULT OF A PARASYMPATHETIC-SYMPATHETIC IMBALANCE—G. E. Hall, Department of Medical Research, and R. A. Cleghorn, Department of Medicine, Banting Institute, University of Toronto.

There is experimental support to the contention that lesions, perhaps the result of nervous imbalance, may be found in several systems of the body in the same individual (Hall, Ettinger and Banting, 1936). In 100 per cent of the animals dying of non-infectious myocarditis, with associated coronary changes produced by daily injections of acetylcholine, severe congestion was present in either the pyloric end of the stomach or in the duodenum or both. Blood was passed from the bowel during life by these animals. Often too, marked congestion was evident about the ileocæcal juncture and the lower rectum. These changes were duplicated in other animals suffering from long-continued stimulation of the vagus nerves. In all cases typical "cardiac livers" were found.

Similar lesions occur during adrenal insufficiency in dogs in which failure of sympathetic nerves leads to a relative preponderance of parasympathetic activity.

CARCINOGENIC HYDROCARBONS IN TISSUE CULTURE—E. Marie Hearne, Strangeway's Research Laboratory, Cambridge, England, and Department of Medical Research, Banting Institute, University of Toronto.

Mouse fibroblasts were cultivated *in vitro* in the presence of 20-methylcholanthrene and 1, 2, 5, 6-dibenzanthracene. The tissue was grown in Carrel flasks and by the hanging drop method in a medium containing approximately 0.01 mg. of the hydrocarbon per c.c. Water-soluble compounds as well as suspensions of the hydrocarbons with lecithin and with serum as dispersing agents were used. The controls contained related non-carcinogenic hydrocarbons and the solvents used in the preparation of the solutions. The cultures were fixed in Navashin's fluid, and were stained with iodine-gentian-violet. Cultures containing the water-soluble carcinogenic hydrocarbons showed increased outgrowth and a tendency for the chromosome halves to fall apart precociously in nodes and loops during the prophase stage of mitosis.

STUDIES ON WATER BALANCE IN THE ALARM REACTION—John Howlett (by invitation) and J. S. L. Browne, McGill University Clinic, Royal Victoria Hospital and Department of Biochemistry, McGill University, Montreal.

It has been shown by Selye that the response of the organism to non-specific nocuous agents can be recognized as a definite syndrome. The first stage of this syndrome has been called the "alarm reaction". One of the signs of the alarm reaction is the development of a tendency to formation of œdema.

In the present experiments normal and adrenalectomized rats were used and the nocuous agent was either surgical shock or histamine. At the time of the operation or of the injection of histamine 0.85 per cent sodium chloride solution (one-tenth the body weight of the animal) was injected intravenously. The excretion of water and salt in the urine was followed at intervals thereafter. At the end of 23 hours the animals were killed and examined for evidences of œdema and other changes of the alarm reaction. Normal untreated animals excreted nearly the whole of the injected amount of saline in six hours. "Alarmed" non-adrenalectomized animals excreted varying amounts depending upon the severity of the injury. The "alarmed" adrenalectomized group under the conditions of the experiment excreted only very small amounts. Two c.c. (20 dog units) of an adrenal cortex extract given intravenously, replacing an equal volume of saline, caused water and salt to be excreted more rapidly in the "alarmed" adrenalectomized group, and caused the earlier disappearance of œdema. Cortin had no action on the rate of excretion in the normal non-treated group. It is suggested that the disappearance of œdema in the alarm reaction is facilitated by an increased output of cortin from the adrenal.

After pre-treatment with histamine in gradually increasing doses, the effect of the substance in producing water retention in normal and adrenalectomized animals is much lessened.

THE EFFECT OF CHANGES IN BLOOD PRESSURE UPON BLOOD FLOW IN DENERVATED TISSUES—Laurence Irving, Department of Biology, University of Toronto.

Changes in the flow of blood in various tissues have been observed by means of a heated electrical resistance wire blood flow meter. When the artery supplying a tissue is constricted the flow meter indicates the reduction in flow promptly and within less than two seconds, so that the lag in the instrumental record is even shorter. When the artery is again released, the blood flow returns rapidly, but not instantaneously, often increasing during recovery until the flow is greater than it was before. This gradual change in the opposition to the return of blood flow characterizes muscle particularly, and the vessels in the muscle appear to yield slowly or not at all to the influence of small increases of blood pressure.

This restraining influence upon flow is not so clearly seen in the brain, in which the blood flow usually increases with small increases in arterial pressure. There is, however, a definite elastic tone in the vessels of the normal brain, for after cutting the cervical sympathetic, flow through the brain usually increases more rapidly and extensively when the arterial pressure rises. The same appearance is seen in the flow through muscles after severing the voluntary nerves or often after excising the appropriate part of the sympathetic chain. In the denervated muscle an increase in arterial blood pressure often causes a sudden and rapid increase in blood flow such as is never seen in a normal muscle.

The vascular system in muscle and brain is normally controlled so that sudden compensatory constriction occurs in the vessels of normal tissue to oppose an increase in arterial pressure, and this ability for sudden compensatory constriction is lost with sympathectomy. The normal vascular system is damped against the effect of pressure changes, but it is undamped after sympathectomy.

ACTION POTENTIAL STUDIES ON THE INFERIOR MESENTERIC GANGLIA—D. P. C. Lloyd (by invitation), University Laboratory of Physiology, Oxford; and the Department of Medical Research, Banting Institute, University of Toronto.

During the course of an analysis of the transmission pathways through the autonomic nervous system supply to abdominal and pelvic viscera, the inferior mesenteric ganglia have been studied by the technique developed by Eccles (1935). There are seven fibre pathways from each preganglionic inferior splanchnic nerve through the ganglia; large and small direct fibres to the ipsilateral hypogastric nerve, synapsed paths to the ipsilateral hypogastric nerve, direct fibres to the ipsilateral hypogastric nerve with a collateral path synapsed in the contralateral ganglion, direct and synapsed paths to the contralateral hypogastric nerve. The pathways entering the colonic nerve are synapsed. There is an overlapping distribution of preganglionic fibres from different ipsilateral inferior splanchnic nerves to the ganglion cells as indicated by occlusion. There is no indication of bilateral overlap at the ganglion cell. Slow potential waves are seen with ganglionic recording. The identity of threshold for the conducted potentials and the slow waves suggests the identity of the preganglionic fibres initiating the cell potentials.

CHOLINE-ESTERASE IN RELATION TO PARASYMPATHETIC NERVOUS SYSTEM—G. W. Manning (by invitation), J. M. Lang (by invitation), and G. E. Hall, Department of Medical Research, Banting Institute, University of Toronto.

The choline-esterase activity of normal dog sera is markedly inhibited (*in vivo*) by eserine (0.05 mg./kilo) for 25 to 30 minutes. The onset and release of this inhibition appears to be very rapid. This inhibition can be maintained for long periods of time (3 weeks) by the continuous intravenous injection of dilute eserine solution without stimulating effects of the drug being evident. Larger doses of eserine produce a typical physiological response without causing any further decrease in enzyme activity.

Blood samples taken at 20-minute intervals during the first 2 to 3 hours do not differ appreciably from the normal in respect to blood sugar level. Similarly daily samples taken from animals receiving eserine continuously are within normal limits.

Blood samples taken at 20-minute intervals following the injection of atropine and acetylcholine show no appreciable difference from the normal in respect to both choline-esterase activity and blood sugar level. Similar samples following pilocarpine show an increase in blood sugar within the first two hours with no effect on the choline-esterase activity.

THE SELENIUM DEHYDRATION OF α-TOCOPHEROL—C. S. McArthur (by invitation), and E. M. Watson, Department of Pathological Chemistry, University of Western Ontario, London.

The observations of Evans, Emerson and Emerson (*J. Biol. Chem.*, 1936, **113**: 319) concerning the isolation from wheat germ oil of an alcohol, α-tocopherol, having the properties of vitamin E, have been confirmed. In an attempt to determine the structural nature of this alcohol, two samples of α-tocopherol were subjected to dehydrogenation under the influence of selenium at a temperature range of 300 to 325°. Substances possessing the ætiocholane type of structure give upon dehydrogenation, small yields of Diel's hydrocarbon, namely, 3-methylcyclopentenophenanthrene, whereas under the same conditions, triterpenoid substances yield methyl substituted naphthalenes, notably 1, 2, 7-trimethylnaphthalene (sapotalene). The dehydrogenation of α-tocopherol by selenium yielded a mixture consisting of a fluorescent oily fraction and a volatile crystalline sublimate. On standing in etherial solution, this crystalline substance changed to a very volatile material. Spectroscopic examination and microanalysis indicated that it was duroquinone ($C_{10}H_{12}O_2$). Until the contrary is proved, this product is considered to represent a branched side chain. The removal of a chain of 10 carbon atoms from the α-tocopherol molecule ($C_{29}H_{50}O_2$), leaves 19 carbon atoms, the number required for an ætiocholane skeleton. This evidence suggests, therefore, that α-tocopherol possesses such a structure.

THE EFFECT OF PULMONARY VENTILATION ON THE ACTION OF ADRENALINE—George W. Stavraky, Department of Physiology, University of Western Ontario, London.

In spinal cats adrenaline was administered intravenously in doses of 0.2 c.c. of 1 in 20,000 solution.

Changes in artificial respiration markedly alter the effect of adrenaline on the arterial blood-pressure. With optimal ventilation the adrenaline effect is maximal, while hyper- and hypo-ventilation markedly reduce the rise in blood-pressure.

To produce maximal alterations in the effect of adrenaline on blood-pressure by changes in pulmonary ventilation the adrenal glands and their spinal centres must be intact. Adrenalectomy or destruction of the spinal cord greatly reduces the sensitivity of the preparation to small doses of adrenaline.

The results obtained favour the conception of a continuous liberation of adrenaline by the adrenal glands in the spinal cat, and show the beneficial effect of adequate oxygenation on the action of adrenaline.

TISSUE LOSS FROM THE ENDOMETRIUM DURING MENSTRUATION—M. C. Watson (by invitation) and E. W. McHenry, Department of Obstetrics and Connaught Laboratories, University of Toronto.

Observations on the endometrial development of monkeys following œstrone and progestin treatment justify the following conclusion. During the functional stage the internal economy of the epithelial cells in the endometrium is so altered by the accumulation within the cell of the elements of the secretion to be elaborated that a return to their former state after the stimulus to the formation of secretion has been withdrawn is impossible. Therefore, when the stimulus from progestin is withheld these functioning cells die and dissolution of the cells results in macroscopic tissue loss.

Other papers read and omitted here for lack of space are given below. A complete reprint can be obtained from Dr. G. H. Ettinger, Queen's University, Kingston, Ont.

THE USE OF COLOUR FILTERS IN PHOTOELECTRIC COLORIMETRY—K. A. Evelyn.

THE DIRECT REACTION OF BILIRUBIN IN SERUM—H. T. Malloy, J. F. McIntosh and K. A. Evelyn.

ELECTROENCEPHALOGRAMS FROM VARIOUS PARTS OF THE CENTRAL NERVOUS SYSTEM—F. R. Miller.

A STUDY OF THE INHIBITION OF THE ACTIVITY OF PANCREATIC LIPASE—L. Rabinowitch and A. M. Wynne.

MEASUREMENT OF THE TIME FACTORS OF EXCITATION OF MUSCLE—D. Y. Solandt and C. G. Smith.

THE PHYSIOLOGY OF THE SHEEP TAPEWORM, *Moniezia Expansa* BLANCHARD—R. A. Wardle.

SOME PHARMACOLOGICAL ACTIONS OF KALMIA AGUSTIFOLIA—R. A. Waud.

A HIGH SENSITIVITY RECORDING SYSTEM OF WIDE FREQUENCY RESPONSE—G. A. Woonton.

Topics of Current Interest

Prontosil in Puerperal Infections

At a meeting of the Section of Obstetrics and Gynæcology, British Medical Association, held at Belfast, July 21st, Mr. G. Gibberd opened a discussion on prontosil and similar compounds in the treatment of puerperal infections due to the hæmolytic streptococcus. His paper was based on 157 cases of puerperal infection treated at Queen Charlotte's Hospital between January, 1936, and March, 1937. After a preliminary reference to the various types of the drug and the dosage used, he compared this series of cases with a control series treated in the hospital for the two years before the introduction of the new drug. The cases were divided into groups according to the clinical invasion of the infection in the patients, and a comparison of the results in each case with the parallel set of cases in the control series was shown in a table. A second table showed the comparison between the present series and the control series in the duration of the illness (interval between confinement and discharge from hospital) in non-fatal cases in which an inflammatory mass was demonstrated beyond the limits of the birth canal. This table brought out the much shorter time spent in hospital by patients who had been treated with prontosil. In conclusion, Mr. Gibberd pointed out that the mortality rate from hæmolytic streptococcal infections had been much reduced by the new drug. It was necessary to consider whether the improvement since January, 1936, was due to the efficacy of the treatment or to a change in the virulence of the prevalent organism. Both factors might be concerned. In non-fatal cases in which tissues beyond the limits of the birth canal had been invaded there was some clinical evidence that the new drug did actually hasten the resolution of the inflammatory process. This seemed to show that the treatment rather than a change in the virulence of the organism was responsible for the improvement.

Dr. Doris E. Brown (Belfast) reported 30 cases of puerperal sepsis due to Group A hæmolytic streptococcus that had been treated with prontosil in the Royal Maternity Hospital, Belfast, between May, 1936, and May, 1937. Of the 30 cases, 20 had a local infection of the uterus, 7 were cases of septicæmia, and 3 had general peritonitis alone. Of the 20 cases of local infection, 19 appeared to be benefited by prontosil, and there were no deaths in this group. For three years before the introduction of prontosil the death rate for cases of septicæmia was 87.5 per cent, and the mortality for all cases due to infection by the hæmolytic streptococcus was 23.53 per cent. Since the use of the drug the mortality rate in cases of septicæmia was 28.57 per cent, and for all cases of puerperal infection 6.6 per cent. Prontosil had also been given to 21 patients with mastitis. In 20 resolution was complete, and the other patient was left with a small residual abscess which rapidly cleared up on incision. Of 18 patients with mastitis—previous to the introduction of prontosil—9 developed breast abscess, which were incised. Mr. L. Carnac Rivett emphasized certain points in the figures presented by Mr. Gibberd—for example, the sudden and dramatic drop in the cases of septicæmia from an average mortality of 71 per cent to a mortality of 27.3 per cent.

Prof. H. J. Drew Smythe (Bristol) referred to a year's use of prontosil and its derivatives. The mortality rate was practically the same in the series treated with prontosil as in those not so treated, but the main point was the rapidity of cure in the treated cases.

Dr. Bethel Solomons (Dublin) felt there was a grave danger in the drug giving a false sense of security. The general practitioner must be made to realize that he must not produce cases of failed forceps in the belief that prontosil would always act as a cure for the ensuing

septicæmia. They had gone through the gamut of dettol cream, vaccines, and other possible cures for sepsis, but real cure still remained in prevention, which could only be accomplished by a knowledge of normal obstetrics as taught by skilled teachers.

Prof. J. Chassar Moir (Oxford) said that a few clinical reports had appeared which suggested that in certain individuals protracted prontosil therapy might dangerously interfere with the blood-forming mechanism. This urgently called for investigation. It seemed unwise to give prontosil or its allies as a routine prophylactic measure. He also referred to the remarkable effect the drug had in combating *B. coli* infection of the urinary tract. In most cases the urine could be rendered sterile in about five days. This might account for the beneficial action of the drug in some cases of puerperal pyrexia due to a coincident urinary infection.—From the *British Medical Journal.*

The Ten "Golden Rules" of Cancer Examination

Ten "golden rules of cancer examination" have been laid down by the American Society for the Control of Cancer as a "guide and aid to laymen who want a complete general physical examination" that may reveal the possible presence of cancer at a stage when it is still a curable disease.

The rules were drafted by Dr. Frank E. Adair of Memorial Hospital, in cooperation with Dr. Burton T. Simpson, director, State Institute for the Study of Malignant Diseases, Buffalo, and Dr. James Ewing, director, Memorial Hospital.

"The positive finding of any of the signs and symptoms which are sought in this examination does not necessarily mean that cancer is present, but it is suggestive and may later lead to the detection of cancer. Their discovery will probably be followed by a recommendation of a visit to a surgeon, a radiologist or a cancer specialist.

"These rules are offered as a guide and aid, not as a complete final judgment. A cancer will rarely escape detection if the ten golden rules of the cancer examination are observed."

The rules follow.

1. Examine the lips, tongue, cheek, tonsils and pharynx for persistent ulcerations; the larynx for hoarseness and the lungs for persistent cough.
2. Examine the skin of the face, body and extremities for scaly bleeding warts, black moles and unhealed scars.
3. Examine every woman's breast for lumps or bleeding nipples.
4. Examine the subcutaneous tissues for lumps of the arms, legs and body.
5. Investigate any symptoms of persistent indigestion or difficulty in swallowing. Palpate the abdomen.
6. Examine the lymph node system for enlargement of the nodes of the neck, groin or arm pit.
7. Examine the uterus for enlargement, lacerations, bleeding or new growths.
8. Examine the rectum and determine the cause of any bleeding or pain.
9. Examine the urine microscopically for the presence of blood.
10. Examine the bones and take a radiograph of any bone which is the seat of a boring pain, worse at night.

Abstracts from Current Literature

Medicine

Rheumatic Fever as a Familial Disease. Environment, Communicability and Heredity in their Relation to the Observed Familial Incidence of the Disease. Wilson, M. G. and Schweitzer, M. D., *J. Clin. Investigation,* 1937, **16**: 555.

The concentration of rheumatic fever in certain families, and particularly the frequent occurrence of multiple cases in the same household, has long been recognized. The familial incidence of rheumatic fever reported, based on clinical studies, ranges from 15 to 58 per cent. Three factors have been implicated in the observed familial incidence of this disease: first, common environmental conditions; second, communicability; and, third, susceptibility, probably on a hereditary basis. Up to the present time conclusive evidence establishing any one of these hypotheses has not been presented.

The authors studied these factors in 112 families, observed over a period ranging from three to eighteen years. Environment and contagion seemed to play no part, or, at least, their exact rôle could not be determined. Their studies indicate that there is a hereditary factor distributed among the population which makes the bearers susceptible to rheumatic fever. This factor is transmitted as a single autosomal recessive gene. Hereditary susceptibility would seem to determine the *familial* incidence of the disease, but may not necessarily be the sole condition essential for its development.

JOHN NICHOLLS

Surgery

Injuries of the Hands Due to Shattered Porcelain Handles of Water Faucets. Steenrod, E. J., Ghormley, R. K. and Craig, W. McK., *Surg., Gyn. & Obst.,* 1937, **64**: 950.

Attention is drawn to the fact that the ordinary porcelain handle has a metal core over

which the porcelain is cemented or attached by a metal screw. A series of 12 injuries to the palm is reported from shattering of the porcelain due to too strenuous force being applied as a result of leaking faucets. The authors prefer brachial plexus block in order to have ready definition of tendons, a short distal end usually being present. Such lacerations usually involve deep structures such as the tendon of the flexor pollicis longus and branches of the median nerve; they are major surgical problems. The authors advise early active movements after the proper reparative measures are performed with brief duration of splinting.

FRANK DORRANCE

Fractures of the Humerus. Anderson, R., *Surg., Gyn. & Obst.*, 1937, **64**: 918.

A method of reduction and fixation of fractures of the humerus by a modified "anatomic leg splint", and the use of two half-pin units—2 half-pins and clamping bar, each—incorporated in a plaster-of-paris cast is given in detail. The half-pins are inserted in such a manner into the bony cortex as to give traction and counter-traction and at the same time allow for early movement of all joints without redisplacement of the fragments. Intravenous anæsthesia, supplemented by morphine, is usually sufficient for application. This method allows for brief duration of hospitalization, early movements of joints, and practically ambulatory treatment except for the initial operative measures. The author outlines an expansion to include severe fractures of the ulna and radius with or without fractures of the humerus.

FRANK DORRANCE

Fractures of Both Bones of the Forearm. A Method of Fixation. Bisgard, J. D., *Surg., Gyn. & Obst.*, 1937, **65**: 90.

The author has used 2 smooth, blunt-ended pins, inserted in drill holes through the apposing ends of fragments, to fix and retain the fragments, thus preventing enroachment upon the interosseous space. The pins are allowed to protrude from the skin, and are withdrawn after bony union has taken place. The author reports 2 successful cases.

FRANK DORRANCE

Obstetrics and Gynæcology

Identification and Significance of Spirochetes in the Placenta. Dorman, H. G. and Sahyn, P. F., *Am. J. Obst. & Gyn.*, 1937, **33**: 954.

The finding of spirochætes in the placenta in 105 cases is recorded. Spirochætes can be found in the placenta of the syphilitic newborn in sufficient frequency to justify the search for them in suspicious cases. The search should be made after Levaditi infiltration in portions of the placenta which give an indication of their presence by the existence of pale yellow foci surrounded by dark granular peripheries. In 390 pregnancies from 75 syphilitic mothers who were untreated, and in whom there were demonstrable spirochætes in the placenta of the last delivery, an apparently healthy baby was produced in 3 out of 5 cases. The fact that the newborn baby appears to be healthy does not indicate the absence of syphilis. The successful termination of pregnancy after antisyphilitic treatment does not denote the absence of spirochætes from the placenta. The histopathological appearance of a placenta containing spirochætes is discussed. Thorough antisyphilitic treatment, while it may not cause the disappearance of spirochætes from the placenta, is none the less indicated, as it assures about 90 per cent apparently healthy full-term babies.

ROSS MITCHELL

Anti-proteolytic Properties of Human Blood-serum in Cases of Miscarriage and Premature Labour. Shute, E., *J. Obst. & Gyn. Brit. Emp.*, 1937, **44**: 253.

A study of an abortifacient dose of œstrin in pregnancy is reviewed. A great number of references are made to the experimental side of the question. Methods of demonstrating the excess of an œstrin-like substance in the maternal blood serum with deficiency of vitamin E are quoted. In some instances an imbalance existed between vitamin E and the œstrogenic substance in the blood serum as long as five months before the pregnancy was prematurely interrupted. In the majority of patients in whom the pregnancy terminated spontaneously prior to the last month such interruptions usually occurred at the mid-interval of pregnancy and corresponded to the time of period in the month when the blood content of œstrin was thought to be highest. The resistance to proteolysis temporarily disappeared from the maternal blood serum upon administration of fresh vitamin E and signs of impending labour ceased. If vitamin E is withdrawn the symptoms return.

P. J. KEARNS

Observations on the Morbid Histology of the Kidney in Eclampsia and Other Toxæmias of Pregnancy. Keller, R. J. *et al.*, *J. Obst. & Gyn. Brit. Emp.*, 1937, **44**: 320.

Sections from the kidneys of 33 patients dying from typical eclampsia were examined. The changes noted showed a striking uniformity. The tufts were moderately enlarged and pouting into the mouth of the tubules. There was a remarkable absence of red blood cells from the glomerular capillaries, and these latter were usually narrowed or occluded by swelling of the endothelium. Leucocytic infiltration was absent. Swelling of capsular endothelium was not

constant. Casts were numerous. The lesion was diffuse, yet there was a wide variation in the degree of tubular damage. Clinically the group consisted of 18 primigravidæ and 15 parous. Hypertension was observed in all but one case; albumin was present in all. The degree of damage to the kidneys did not always correspond to the severity of the disease, clinical toxæmia, or the occurrence of fits. It was difficult to decide whether the lesion was a degenerative one, or a definite glomerulitis.

P. J. KEARNS

Pathogenesis of Eclampsia. Addis, W. R., *Brit. M. J.*, 1937, **1**: 1103.

In angiospasm we have a common pathological factor underlying and uniting all the varying expressions of eclampsia. The angiospasm spreads out into various tissues and organs, producing effects which in themselves appear to be completely unrelated. In the brain it results in hypertensive encephalopathy; in the kidney, albuminuria and oliguria with high specific gravity; in the liver, a periportal necrosis; in the subcutaneous tissues, an anasarca; and in the skin, though it is frequently masked by deficient oxygenation of the blood, pallor. It is suggested these variations are the result not of a varying cause, but of the variety of tissues in which the cause acts, and there is one single pathogenic factor, namely, angiospasm.

ROSS MITCHELL

Rectal Injuries Caused by Enema Given Through Rigid Nozzle. Galbraith, W. W., *Brit. M. J.*, 1937, **1**: 859.

A case is reported of almost complete loss of the recto-vaginal septum and posterior wall of the rectum caused by the bone nozzle of a Higginson's syringe used to give an enema. Colostomy was performed and the patient recovered after over two months spent in hospital. Reference is made to other reported cases of similar nature. The rigid douche or enema nozzle can hold such potential dangers that its use should never be permitted under any circumstances, and more especially in the hands of the patient, her friends, or even a nurse.

ROSS MITCHELL

Pædiatrics

Oral Administration of Œstrin to Premature Babies. Potter, M. F., *Brit. M. J.*, 1937, **1**: 1201.

Aschheim (1927) suggested that premature babies might be benefited by the administration of œstrin. Since September, 1936, œstrin has been used orally for premature babies at the Bristol Maternity Hospital. One dragée of 500 international units of œstrin was dissolved in two drachms of warm water and one drachm given as a dose twice daily. Details are given of eleven premature and one sick baby treated with progynon. This preparation of œstrin, given orally, appeared definitely helpful. The babies caused less anxiety, the feeds were taken better, the initial loss of weight appeared less, and was usually made up sooner. No baby to whom it was given died.

ROSS MITCHELL

Urology

Primary Vesical Calculus. Siddall, A. C., *J. Urol.*, 1937, **37**: 268.

This report is a study from the standpoint of etiology of 37 cases of vesical calculi admitted to the Canton Hospital of South China in 1930. Four factors are considered.

1. Endocrine. Disturbances of the thyroid gland are common in this area, but of all the cases studied none showed evidence of such disease. There were 12 cases in children under 10 years and the remainder were about equally divided in the various age-groups. All but two cases were in males and 43 per cent were farmers.

2. Vitamins and diet. This is dealt with in some detail, and the findings do not indicate that the people who suffer from vesical calculus also suffer from vitamin A or D deficiency. Xerophthalmia is rare in Canton but is common in north China where vesical calculus is less frequent. The Chinese farmer takes an abundance of fresh vegetables, yet most of the calculi are composed of uric acid, urates and oxalates, and form in an acid medium, whereas most calculi in rats on deficient diets are of phosphates and carbonates. Further, biopsy specimens from the bladder mucous membrane of 11 cases showed no evidence of metaplasia in any case in which stone was present. Beriberi is common in the urban districts, 27 cases being treated at the Canton hospital, as against 1 case of xerophthalmia, yet none showed vesical calculus.

The diet of these people is mainly rice and fresh vegetables; consequently the uric acid must be of endogenous origin. The following factors tend to increase this—strenuous exercise, fever, and exposure to low temperatures, caffein and ultra-violet rays. These factors are all operative on the people most afflicted with stone. They work hard under a burning sun, they take quantities of tea, they are victims of malaria, dysentery, etc., and in the winter, though the temperature is not low the cold is very penetrating and they suffer acutely.

3. Water and tea. It appears that stone is rather less common among people in Canton drinking river water of low calcium content than country people drinking harder water. However, most water is taken as tea, and it is estimated that the average farmer gets from 2 to 4 grains of caffein daily. This may be of

much import in the increased excretion of endogenous uric acid.

4. Stone nucleus. Of all stones examined uric acid and urates were found in the nucleus of 77 per cent. Calcium oxalate from the vegetables of the diet was, as one would expect, also a very constant constituent. The author assumes that strenuous exercise will cause albuminuria, and that the presence of this albumin may disturb the protective colloid in the urine and allow precipitation of the large amounts of uric acid and oxalate present. He also assumes that a certain amount of stagnation is necessary to allow time for masses of salts to separate out; therefore the bladder is the logical place for stones to form rather than the kidney, and they are not common in the kidney in that area.

N. E. BERRY

The Arterial Distribution Within the Prostate Gland: Its Rôle in Transurethral Prostatic Resection. Flocks, R. H., *J. Urol.*, 1937, **37**: 524.

With the advent of the present technique of transurethral prostatic resection there has been a renewal of interest in the arrangement of arteries within the normal and hypertrophied prostate gland. There are two groups of arteries within the prostate—an external capsular group which shows little change with age and with the occurrence of hyperplasia, and an internal group, which enlarges significantly with age and very marked hyperplasia. The latter is very important in the consideration of transurethral surgery and local repairs following this operation, for two reasons: (1) its anatomical arrangement—the urethral group of arteries penetrates at the prostatic-vesical junction and then turns distally in a course more or less parallel to the urethral surface; (2) its ultimate destination—this group of arteries forms the main source of blood supply to the hypertrophied portion of the gland.

The above facts tend to substantiate certain clinical observations. There is considerably less bleeding during the latter stage of the operation; the tissue left behind after resection shows differences in rate and character of healing.

J. V. BERRY

Neurology and Psychiatry

Sacrococcygeal Teratoma. de Veer, J. A. and Browder, J., *Ann. Surg.*, 1937, **105**: 408.

It is important to differentiate sacrococcygeal teratomas from sacral meningomyelocele at an early age, as the former offer excellent possibilities for radical surgical cure. Further, certain portions of the teratoma may in later years become malignant or increase in size by intrapelvic as well as extrapelvic growth to such an extent that cure is impossible. The large majority of sacrococcygeal teratomas in infants are benign and are not attached to important structures. The only residual abnormality to be expected after operation is atrophy of the gluteal muscles in instances where the tumour is very large. Four cases of radical removal of these growths in infants are reported, the first three with apparent permanent cure, the fourth dying 15 months after operation from a malignant intrapelvic growth. Certain features characterize the sacrococcygeal teratoma: (1) they are covered with true thick skin; (2) they vary widely in size (commonly are very large); (3) a rapid increase in size is usually noted in the early months of life; (4) most of them can be recognized as containing solid and cystic portions. They are not reducible and do not enlarge when the child cries; (5) they are rarely associated with motor or sensory disturbances; (6) hydrocephalus is not encountered. These findings are at variance with the findings in meningomyelocele.

FRANK TURNBULL

Prefrontal Lobotomy in the Treatment of Mental Disorders. Freeman, W. and Watts, J. W., *South. M. J.*, 1937, **30**: 23.

This is the first report in American medical literature of a rather daring procedure introduced by Moniz, of Lisbon, early in 1936. Psychiatric and neurosurgical opinion of the operation throughout America is represented by Adolf Meyer's cautious remark in discussing the paper, "I am not antagonistic to this work but find it very interesting". Six patients in whom mental states had proved refractory to conservative methods of handling were chosen for operation. In all of these patients there was a substratum of worry, apprehension, anxiety, insomnia and nervous tension. In all of them these particular symptoms were relieved to a greater or less extent by operation. In some patients there was amelioration or even disappearance of certain other symptoms, such as disorientation, confusion, phobias, hallucinations and delusions that were present before operation. None died and none were made worse. It appeared as though the "sting" of the psychosis had been drawn.

The outstanding deficit symptom resulting from operation is a certain lack of spontaneity. The operative technique consists of making a burr hole over each frontal lobe 3 cm. lateral to the mid line in a vertical plane which passes 3 cm. anterior to the external auditory meatus. Through these openings six spherical cuts about 10 mm. in diameter are made beneath the medial and lateral surfaces of each prefrontal area.

FRANK TURNBULL

Dermatology

Seborrhœic Dermatitis. Percival, G. H., *Brit. M. J.*, 1936, **2**: 854.

True seborrhœa, excessive activity of the sebaceous glands, leads to certain cutaneous disorders—premature alopecia, acne and rosacea. Under the name "seborrhœic dermatitis" however, have come to be grouped other conditions of widely varying etiology which may occur in skins far from seborrhœic. Amongst these is pityriasis capitis — ordinary dandruff — which often has added to it an inflammatory element, so that small medallion- or petaloid-shaped dry, red, scaly areas occur on the scalp, the presternal and interscapular regions; in addition to "seborrhœic dermatitis". Pityriasis corporis, or "flannel rash", are terms sometimes applied to this condition. The inflammatory catarrh may at times be widespread but remains dry; the skin in this disease, in fact, is often abnormally dry rather than oily. Neither dandruff nor the widespread rash which sometimes results from it, then, are truly "seborrhœic", being, in fact, a manifestation of a heavy infection with a yeast, sometimes associated with the common *Staph. albus* of the skin.

A second clean-cut clinical entity also often grouped under the term "seborrhœic dermatitis" consists of the moist flexural eczemas. The moist, exudative lesion usually starts in the fissure behind the ear, and may spread, along the natural folds of the skin, to involve the adjacent scalp and eventually a great part of the body surface. The fully developed lesion is characterized by its clean-cut edge in the form of a segment of a circle, by a fissure surrounded by white sodden epithelium in the retro-auricular fold and by profuse exudation from pin-point holes over the whole inflamed area. Fibrinous crusting occurs in variable degree. Inframammary and intragluteal folds may furnish the starting point of the lesion, and when the eruption becomes generalized such areas are always most heavily involved, along with well-haired parts. Localized cases may clear in a few weeks; generalized cases may take several years, and tend to relapse. The causal organism is almost undoubtedly a streptococcus.

While pityriasis lesions clear up readily with sulphur and salicylic acid the flexural eczemas are much more resistant. They are intolerant of grease in any form. The author suggests as the best regimen starch jelly to stop exudation, then aqueous gentian violet as a "varnish", followed in several days by starch again, or ichthyol paste, if tolerated. Crude tar is of value in the chronic stage, while x-ray may help in effecting a final cure.

W. FORD CONNELL

Pathology and Experimental Medicine

Mammography. Hicken, N. F., *Surg., Gyn. & Obst.*, 1937, **64**: 593.

This term has been chosen to express a procedure of outlining by x-rays the ductal and secretory system of the breast by injecting contrast media into the openings of the ducts. By this measure the author has been able to demonstrate the differences in virginal and parous breasts in the several phases of their physiological activities, and to outline the influences of papillomas, simple retention cysts, cystic degeneration of the breast, galactoceles, retention mastitis and carcinomas on the ductal system of the breast. The contrast media used were thorotrast, lipiodine, hippuran, diodrast, bismuth oxychloride, 15 per cent sodium iodide, and air. Thorotrast proved to be the least irritating and possessed sufficient fluidity to enter the smallest lacteals. Lipiodine heated to 120° F. was of equal value. Air was used as a replacement medium in simple retention cysts, galactoceles and cystic degeneration of the breast. The contrast media were readily removed from the ducts by gentle massage and the breast pump. Before injection the ducts should be gently massaged to remove all secretions. Aseptic technique was followed during injection. A blunt 25-gauge needle was used in cannulization. With gentleness, persistence and patience all the ducts can be injected. Injection should not be made into the infected, lactating or frankly carcinomatous breast. It is possible by this method to have information of the more exact nature of the ductal system and the mammary tissue in each breast.

FRANK DORRANCE

Studies of the Principle in Liver Effective in Pernicious Anæmia. IV. The Therapeutic Activity of its Multiple Factors. Jacobson, B. M. and Subbarow, Y., *J. Clin. Investigation*, 1937, **16**: 573.

These authors' studies of the therapeutic activity of purified liver extract in pernicious anæmia suggest that the hæmatopoietic effect may be exerted by an augmentation action of at least three chemically distinct accessory factors upon the activity of a primary factor. Of the three known accessory factors one is l-tyrosin; another contains a complex purine; the third is a peptide. The accessory factors are completely devoid of the primary factor, and without the addition of the primary factor are therapeutically inert. The primary factor has been studied in an amorphous state. Its chemical nature is still undetermined. Without the addition of the three accessory factors the primary factor is, therapeutically, only slightly active.

JOHN NICHOLLS

Acute Mountain Sickness; the Effect of Ammonium Chloride. Barron, E. S. G., Dill, D. B., Edwards, H. T. and Hurtado, A., *J. Clin. Investigation*, 1937, **16**: 541.

Detailed description of the symptoms of mountain sickness have been given by those who have studied the disease, from Acosta in 1569 to Monge *et al.* in 1928. However, our knowledge of its etiology has not advanced very much since Paul Bert's fundamental observations, and little has been added to our understanding of its mechanism.

Observations on six human subjects, while on a trip through the Andes, showed that the appearance of acute mountain sickness is not closely dependent on the degree of arterial oxygen saturation and the alveolar air oxygen, down to certain limits. Acute mountain sickness is not prevented by diminishing the alkali reserve of the blood, as shown by the failure of ammonium chloride to prevent it in a rapid ascent from sea level to 4,740 metres. The tissue oxygen transport system (myoglobin and part of the cytochrome complex) probably plays an important rôle in this affection.

JOHN NICHOLLS

Therapeutics

The Use of Ferrous Gluconate in the Treatment of Hypochromic Anæmia. Reznikoff, P. and Goebel, W. F., *J. Clin. Investigation*, 1937, **16**: 547.

Although hypochromic anæmia due to a deficiency of iron is universally treated with iron there is not so much unanimity as to the type of iron compound that should be used. The following postulates, however, are accepted. The dosage must be adequate to ensure a reasonably rapid increase in the hæmoglobin; the iron preparation, in the dosage given, must be tolerated by the patient without undue distress; and the cost of the medication must be within the financial capability of the patient.

The authors studied the effect of ferrous gluconate on 13 patients with hypochromic anæmia. They found it superior to other iron compounds in the following respects. Four of 10 patients who had shown toxic reactions to other iron compounds tolerated iron gluconate without symptoms. The reticulocyte response was equal to that obtained with other compounds. Intramuscular injections presented no advantage over oral administration.

JOHN NICHOLLS

Urinary Suppression Following Blood Transfusion. Baker, S. L., *The Lancet*, 1937, **1**: 1390.

Death following and attributable to blood transfusion after an interval of several days is stated to be the result of urinary suppression. The author reports a fatal case of urinary suppression where the bloods were compatible, but where, obviously, intravascular hæmolysis occurred, and he attributes this to overheating of the blood at the time of transfusion. Experimentally, hæmoglobin has been injected into the blood stream of rabbits and dogs; if the urine be alkaline, oxyhæmoglobin is excreted in a reddish urine, with no ill effects; if the urine be acid, and the concentration of sodium chloride is greater than 1 per cent a brownish granular pigment, believed to be hæmatin, is deposited in the renal tubules, the urine will be brownish and contain casts composed of this brownish granular pigment, and, if the concentration of the urine in the kidney and the quantity of hæmoglobin excreted be sufficient, complete urinary suppression and death will result. On the strength of these animal and chemical studies and the observation of human cases the author concludes that urinary suppression results from hæmoglobinuria only when the urine is acid, and, to prevent this complication, urges the timely administration of alkalis, which are used with success in the treatment of blackwater fever, where suppression of urine is a not uncommon complication.

DAVID RODGER

Artificially Induced Thrombophlebitis. Patey, D. H., *Surg., Gyn. & Obst.*, 1937, **64**: 1002.

In the search for a measure to prevent the development of pulmonary embolism the author expounds certain observations on thrombophlebitis. For the past year he has raised the head of the bed in post-operative cases which might be more subject to this complication, and has had such results that he will continue to do so. Twenty-four to 48 hours after operation the head of the bed is raised 6 to 9 inches and kept there during convalescence. A pillow is placed beneath the soles of the feet.

FRANK DORRANCE

Hygiene and Public Health

Nature of Autarceologic Susceptibility to Poliomyelitis. Aycock, W. L., *Am. J. Pub. Health*, 1937, **27**: 575.

Aycock's experiments corroborate those of other investigators to the effect that blockade by various chemical preparations protects temporarily to a considerable degree against intranasal instillations of poliomyelitis. The preparations used were alum solution, tannic acid, picric acid, and picric acid with glycerin. Experimentally, it would appear that the temporary protection afforded by these substances prevents sub-clinical infections which are thought to be the reason for the large scale immunity of the population. The question is raised as to whether it would be a wise procedure to attempt to

protect large groups of people against poliomyelitis infection, and by so doing prevent the sub-clinical infections which are considered to be valuable. FRANK G. PEDLEY

Zinc Sulphate Prophylaxis in Poliomyelitis. Schultz, E. W. and Gebhardt, L. P., *J. Am. M. Ass.*, 1937, **108**: 2182.

The authors believe that it is a fact that the poliomyelitis virus reaches the central nervous system by way of the olfactory nerve, and that acquired immunity to the disease seems to depend primarily on some kind of modification of the protoplasm of the nerve cell brought about by intimate contact between the virus and the nerve cell. Humoral immunity in their opinion is not an important factor. They have experimented with a large number of chemicals applied to the olfactory mucosa for the purpose of establishing a barrier between the central nervous system and the poliomyelitis virus instilled into the nostrils of monkeys. Many of these chemicals have been effective. Of them zinc sulphate, because of its high protective action in monkeys and its low toxicity, seems to deserve a trial in man. A 1 per cent solution of zinc sulphate in 0.5 per cent sodium chloride and 1 per cent pontocaine is recommended. This solution should be applied once every two weeks when the risk of infection is great. In order for the application to be effective the chemical should actually cover the olfactory area. To accomplish this a special atomizer and a special technique is required. The method of Dr. Max M. Peet is recommended (see following abstract). FRANK G. PEDLEY

The Chemical Prophylaxis for Poliomyelitis. Peet, M. M., Echols, H. and Richter, H. J., *J. Am. M. Ass.*, 1937, **108**: 2184.

The authors are of the opinion that ordinary spraying of chemicals into the nose is probably ineffective in the prevention of poliomyelitis. The chemical should actually reach and cover the olfactory area. It is more difficult to accomplish this in man than in monkeys. The technique recommended is to place the subject in a sitting position with the head back at an angle of 45°. Through a nasal speculum a special atomizer with a very long thin nozzle is introduced along the nasal septum until it passes the middle turbinate. One c.c. of a 1 per cent zinc sulphate, 0.5 per cent sodium chloride, and 1 per cent pontocaine solution is then sprayed on the olfactory area. The pontocaine is used because the operation is apt to cause some pain. Although one application may be sufficient it is recommended that the procedure be repeated on three successive days in order to be perfectly sure that the olfactory area actually has been covered.

FRANK G. PEDLEY

Obituaries

Dr. J. Narcisse Bowin, of Hull, Que., died on July 19, 1937, at the age of sixty-one. He had practised in Hull for sixteen years.

Dr. Bowin was born at St. Hyacinthe, and received his early education at the St. Hyacinthe seminary. Going on to Montreal for his medical studies he graduated in 1900 from the University of Montreal, then a branch of Laval University. For fourteen years he laboured in Beauce county, and practised at St. Madeleine, for seven years before taking up his work in Hull.

Dr. Hugh Stanley Douglas, of Toronto, died suddenly July 10, 1937. He was on the staff of St. Michael's Hospital, and the Hospital for Sick Children, and junior demonstrator in anæsthetics at the University of Toronto. He was forty-one years of age.

Born near Springfield, Elgin County, the son of the late Hugh Douglas, Dr. Douglas received his primary education at St. Thomas. He graduated in medicine from the University of Toronto in 1923. After several years' practice in Detroit he began his practice in Toronto in 1928. He was a war veteran, enlisting for service overseas with the Mechanical Transport, and later being transferred to the Princess Pats. He was wounded severely in the head at the battle of the Somme.

He is survived by his wife and two children; his mother, and two brothers, Dr. Clair Douglas, Detroit, and A. R. Douglas, London, Ontario.

Dr. Charles Alexander Durham Fairfield, of St. Catharines, Ont., died on July 4, 1937. He was born in 1863 and a graduate of Queen's University, (1887).

Dr. Bernard John Funk, of Herbert, Sask., died during the last days of June, 1937, aged fifty-one years.

Bernard John Funk was the son of Mr. and Mrs. John Funk of Neubergthal, Man. Born in 1886, after receiving his early education in his home district, he entered the University of Manitoba to study medicine and graduated in 1915. Coming to Herbert the same year, Dr. Funk commenced to practise in the western town and his skill as a surgeon and his interest in community welfare did much toward making him one of the outstanding members of his profession in south-western Saskatchewan. In the early twenties, Dr. Funk organized his own hospital at Herbert, which supplied medical aid to a large territory, and by 1923 hospital work at Herbert had grown to such proportions that the municipality found it advisable to erect a hospital, the construction of which was largely supervised by Dr. Funk.

For many years the late Dr. Funk had acted as chairman of the Herbert school board and for a number of years he was a member of the Board of Trade executive.

Dr. H. E. Langis, of Vancouver, died on June 11, 1937, aged seventy-nine.

Henri Evariste Levraux Langis, son of Joseph Langis and Melanie Le Page, was born at Bic, Quebec, on October 25, 1857. Among his paternal ancestors were members of the noble family of Poitiers who fought for Montcalm during the siege of Quebec. Others were distinguished officers in the armies of Louis XIV and Louis XV. A maternal ancestor was first seigneur of Rimouski, in 1610.

Educated at the primary school of Rimouski, until 1869, Dr. Langis studied at the Quebec Seminary and Laval University. In 1883 he graduated from the Laval School of Medicine, Montreal.

Following his graduation he entered the employment of the C.P.R. and undertook his first active medical practice in Port Arthur. The next year, following the trail of the pioneers, he left for the West and arrived in Port Moody in July, 1884. Later he succeeded Dr. Hannington as C.P.R. surgeon at Yale.

Realizing the possibilities in the then small settlement of Vancouver, Dr. Langis moved there in 1885. He soon became active in medical circles and was known throughout the Pacific Coast.

Dr. Arthur Rutherford Perry, of Mount Forest, Ont., died on July 12, 1937. He was born in 1875 and a graduate of Trinity University (1900).

Dr. Hermann Ernest Schaef, of London, Ont., died on July 14, 1937.

Born in Germany in 1882 Dr. Schaef came to London when a boy. He received his elementary education there and later graduated in medicine from the University of Western Ontario Medical School (1905). For many years Dr. Schaef conducted a general practice in London, but of late had specialized in x-ray work.

Dr. George Hart Woodland, of Vancouver, died on July 21, 1937. He was a graduate of Dalhousie University (1901).

News Items

Great Britain

The proprietors of *The Lancet* have appointed Dr. Egbert Morland Editor in succession to the late Sir Squire Sprigge. Drs. T. F. Fox and H. M. Kettle have been appointed Assistant Editors.

British Columbia

Tenders for an interns' residence costing approximately $60,000 are being called for by the Vancouver General Hospital. A reinforced concrete building of three storeys is planned, to be erected adjacent to the hospital. The present intern staff numbers nearly forty.

Paying tribute to the community spirit of Cowichan Valley, Hon. E. W. Hamber, Lieut.-Governor, opened the new wing to the King's Daughters' Hospital there on July 19th. His Honour extolled the organization which founded the original hospital in 1911, carried on the burden for twenty years until it became too great and handed the institution over to the Cowichan District Hospital Association. The King's Daughters' Hospital now is an eighty-five-bed institution, with separate wards for children, whites, Indians and Orientals, private rooms for patients too ill for wards, an isolation section, nursing stations, service, supply and sterilizing rooms.

Notifiable diseases accounted for 170 deaths in British Columbia during the month of May. Of these 87 were due to cancer and 44 to tuberculosis. Motor accidents accounted for 12 and puerperal deaths of all types for 2. Cases of notifiable diseases reported during the period June 5th to 26th totalled 1,166. Of these 929 were accounted for by measles, chicken-pox, mumps, scarlet fever, whooping-cough and German measles. There were 69 cases of cancer reported during this period.

Dr. R. E. Mitchell, recently of Sarnia, Ont., has been appointed radiologist at the Royal Columbian Hospital, New Westminster.

As a matter of interest at present the Vancouver General Hospital is one of only two hospitals in Canada admitting Oriental students to the nurses' training school; the other St. Michael's Hospital, Toronto. There is at present one Japanese student in training and two Chinese and one Japanese have been graduated. The Superintendent, Dr. A. K. Haywood, reports that the relations between these students and the patients with whom they come in contact and their fellow students have been cordial and satisfactory

D. E. H. CLEVELAND

Manitoba

Mr. John McEachern, Chairman of the Sanatorium Board of Manitoba, entertained at luncheon in the Central Tuberculosis Clinic on August 3rd in honour of Dr. E. L. Stone, of the Indian Department, Ottawa. The other guests were members of the Sanatorium Board.

Dr. Neil John McLean entertained at the Motor Country Club, Lower Fort Garry, on July 29th in honour of Dr. E. R. Cunningham, Professor of Ophthalmology, West China Union Medical College at Chengtu, Province of Schzewan, West China. Dr. and Mrs. Cunningham (Dr. Gladys Story) are on furlough after seven years spent in China.

Dr. Norman Bethune, head of the Canadian Blood Transfusion Mission in Spain, lectured at the Walker Theatre in Winnipeg, July 19th. A banquet was arranged for him on the following evening by the Winnipeg Committee to Aid Spanish Democracy.

ROSS MITCHELL

New Brunswick

Hon. Dr. W. F. Roberts, Minister of Public Health, continues to make progress towards recovery following a severe illness and operation. He is gradually resuming his practice in Saint John.

Dr. A. S. Chesley, Urologist at the Saint John General Hospital, has recently undergone a major operation and is rapidly recovering.

Dr. A. L. Donovan has been appointed to take charge of the Electrocardiograph Department at St. Joseph's Hospital, Saint John.

Dr. L. G. Pinault, of Campbellton, who has for some months been suffering from illness is once again in practice, and has again begun to take an active part in the affairs of the New Brunswick Medical Society.

At the annual meeting of the New Brunswick Medical Society in Moncton it was notable that a considerable number of physicians appeared in the uniform of the Canadian Army Medical Corps. This was due to the fact that Militia Camp at Sussex was being held at the same time as the Moncton meeting, and due to the kindness of Brigadier-general Page, leave of absence was granted to the members of the Army Medical Corps to attend the scientific sessions of the New Brunswick Medical Society.

The quarterly meeting of the Association of Militia Medical Officers of Canada was held at Camp Sussex, July 2nd, during military camp. The meeting was attended by all officers on Camp duty, as well as by a number of medical officers who came to camp especially for the meeting. The Society was honoured by the attendance of His Honour Lieut.-Gov. Dr. Murray McLaren, Brigadier-general Page, Lieut.-Col. A. H. Landon, A.A. and Q.M.G., and Lieut.-Col. Gordon Holder.

The paper of the evening was presented by Lieut.-Col. R. A. Hughes, D.M.O., M.D. 7, and was a discussion on the physical standards of examination for recruits for the permanent force. The main portion of the paper was confined to the discussion of standards in chest examination. This was presented by the speaker as an outline of his ideas and interpretation of these standards, and was given so as to provoke the freest possible discussion. The discussion of the paper was led by Dr. R. J. Collins, Superintendent of the Saint John Tuberculosis Hospital, followed by Dr. Lachlin McPherson, Assistant at the same Hospital, Lieut.-Col. Landon, Brigadier-general Page, Drs. J. R. Nugent, A. S. Kirkland, Stanley Bridges, Lieut.-Col. D. C. Malcolm, Lieut.-Col. C. M. Pratt, and the Association was flattered in the fact that Col. the Hon. Murray McLaren also took a sincere and interested part in the discussion.

A. S. KIRKLAND

Nova Scotia

Dr. W. G. Wherrett, of Ottawa, Executive Secretary of the Canadian Tuberculosis Association, in an interview, stated that the tuberculosis death rate continues to fall in Nova Scotia. He emphasized that it was a tremendous problem as shown by the high rate. In 1908 it was 215 per 100,000; in 1935 it had dropped to 92 per 100,000. The rate for Canada was 60.3 per 100,000. He also commented on the fact that in the past year more treatments were given than in any previous year. Dr. Wherrett conferred with health officials and those directly connected with tuberculosis control, while in Halifax.

Drs. G. R. Forbes and V. D. Shaffner, of Kentville, were involved in a motor collision recently. The latter was being taken to Wolfville by Dr. Forbes to undergo an emergency operation for appendicitis. Dr. Forbes sustained a broken arm. Dr. Shaffner was unhurt, and later he was operated on. Both are now convalescing.

Dr. Donald Webster, who has spent the past two years at the hospital at Cornerbrook, Newfoundland, has returned to the province. He proposes to take up post-graduate work in New York before engaging in private practice.

N. B. DREYER

Ontario

The Provincial Government announces a grant of $19,000 to the Freeport Sanitarium, to enable that institution to increase its capacity from 160 to 200 beds.

The Provincial Government has completed plans for the erection of a sanatorium at Brampton for tuberculous mental cases. Three farms have been purchased, and tenders will be called for immediately for the erection of an institution to cost approximately one and a half million dollars. This will be the first sanatorium for mental cases in Canada and it is hoped to make it one of the most modern institutions in North America. The preliminary plans call for approximately 500 beds and will require a staff of about 100.

The annual Summer School of the Thunder Bay Medical Society, sponsored by the Ontario Medical Association, was conducted for three days in June. Clinics were held in the hospitals of both Lakehead cities. The visiting lecturers were Drs. E. L. Pope and Fulton Gillespie, of Edmonton.

The Hamilton Academy of Medicine has elected as its President for the current year L. L. Playfair, M.D., F.R.C.S.(Edin.).

Extensive alterations, involving more than $3,000, have taken place at the Bowmanville Hospital. This has been made possible through legacies left by the late John Abrahams, of Soline, and Miss Jennie McNeill, of Clarke Township.

Dr. C. F. Blackler (McGill, 1924) has been appointed Medical Health Officer of the City of Kingston. This appointment involves teaching work in the Department of Preventive Medicine of Queen's University.

With the closing of St. John's Hospital on Major Street, Toronto, the management announces that the medical clinic known as the St. John's Medical Mission will continue in St. John's Garrison Church. It will be carried on in association with the Toronto Western Hospital.

At the annual dinner meeting of the Peterborough Medical Society, a gold-headed cane was presented to Dr. W. D. Scott to mark the completion of half a century of practice. At the same meeting a presentation was made to Dr. J. R. Fraser, of Lakefield, recently retired after fifty-nine years of general practice.

The Porcupine Advance of July 19th, in a one-column, double-spaced editorial, pays a well earned tribute to Dr. H. H. Moore who, for twenty-five years, has been one of the outstanding citizens of the thriving mining city of Timmins. As Medical Officer of Health, Dr. Moore gave great service to the city, enlisting the whole-hearted cooperation of all physicians and the nursing profession, as well as public support for such matters as pure water, safe milk, proper sanitation, protection from epidemic diseases, including smallpox and diphtheria. His unceasing interest in hospital work was another feature of his valuable service to Timmins, where he emphasized the sincerity of his desire for the best care of all those suffering from injury or illness. He had served as Town Councillor and gave service on other boards and organizations. The editorial closes by referring to him as a first-class citizen to whom fitting tribute should be paid on his departure, for he was one of the men who specially helped to build the Timmins of today.

J. H. ELLIOTT

General

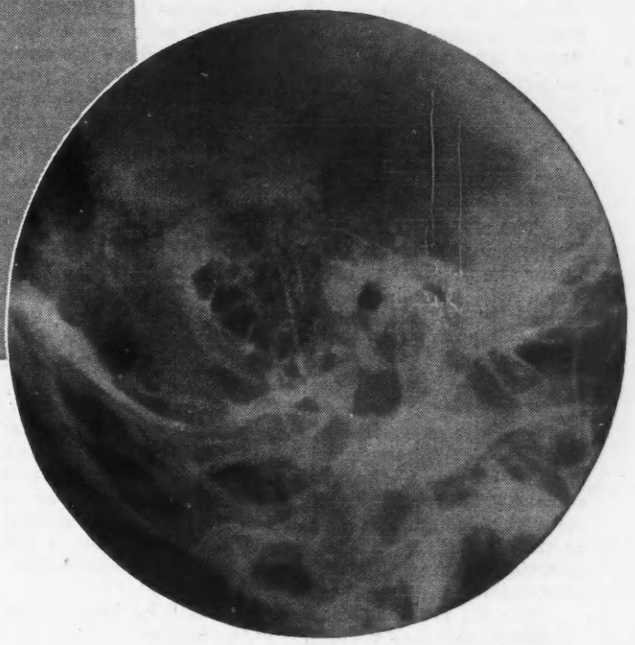
Deaths in Canada from External Violence in 1936.—According to a report issued on July 27, 1937, by the Dominion Bureau of Statistics the number of deaths in Canada from external violence during the year 1936 (preliminary figures) was 7,441 as compared with 6,898 in 1935 and 6,469 in 1934. The rate per 100,000 population was 68 in 1936 as against 63 in 1935 and 60 in 1934. Over the period 1926-36 the highest death rate recorded from external violence was 73 in 1930.

Suicides numbered 922 in 1936, as compared with 905 in 1935 and 927 in 1934. The death rate from suicide was 8.4 in 1936 as against 8.3 in 1935 and 8.6 in 1934. The highest death rate for suicides recorded during the whole period was 9.9 in 1930.

There were 136 homicides in 1936, giving a rate of 1.2 per 100,000. These figures compared with 153 deaths and a rate of 1.4 in 1935, and 142 deaths and a rate of 1.3 in 1934. The highest homicide rate during the whole period was 2.1 in 1930.

The number of violent deaths other than suicides and homicides in 1936 was 6,383 and the rate 58 per 100,000, as compared with 5,840 deaths and a rate of 54 in 1935 and 5,400 deaths with a rate of 50 in 1934. The rate from these causes attained its highest level, 61 per 100,000, in the three years 1928-30.

SAFEGUARDS *in* MASTOID SITUATIONS



Radiograph of the mastoid process

CLINICAL evidence based upon the usual classical signs ordinarily will lead to a diagnosis in acute mastoiditis. Radiographic study is necessary, however, to classify the mastoid as to type—whether it is pneumatic, diplöic, or sclerotic—to determine the extent of pathogenic invasion and the location of the transverse venous sinus.

In complaints of chronic aural discharges, deafness, or earache, x-ray examination will disclose whether the mastoids are involved . . . show whether there is invasion of the pars petrosa, particulary of the labyrinth . . . reveal the presence of tumors.

Preoperative—Postoperative

Thus, preoperatively, radiographs provide information essential to effective handling of the case. . . . At operation the graphic images serve as an accurate map of the area. . . . Postoperatively, x-ray studies afford a convenient way to check up on progress.

In any situation where the mastoids may be involved, comprehensive examination by a competent radiologist is an invaluable safeguard. Canadian Kodak Co., Limited, Toronto, Ontario.

Radiograph of the pars petrosa

RADIOGRAPHS PROVIDE DIAGNOSTIC FACTS

Drownings in 1936, exclusive of those occurring in mines and in land or air transportation, numbered 781 or 12 per cent of the total of fatal accidents. Land transportation accounted for 1,764 deaths, or 28 per cent of the total. Of these, deaths in automobile accidents numbered 1,313, or 21 per cent of all accidental deaths. Excluding those cases where an automobile was involved, there were 238 deaths in railway accidents and 28 in street-car accidents. Accidents in mines and quarries accounted for 138 deaths. There were 16 persons killed during the year in accidents of air transportation.

The International Assembly of the Inter-State Post-graduate Medical Association of North America, under the presidency of Dr. John F. Erdmann, of New York, will be held in the beautiful new public auditorium of St. Louis, Missouri, October 18th, 19th, 20th, 21st, and 22nd, with pre-assembly clinics on Saturday, October 16th and post-assembly clinics, Saturday, October 23rd, in the hospitals of St. Louis.

The aim of the program committee, with Dr. George Crile as chairman, is to provide for the medical profession of North America an intensive post-graduate course covering the various branches of medical science. The program has been carefully arranged to meet the demands of the general practitioner as well as the specialist. Extreme care has been given in the selection of the contributors and the subjects of their contributions.

The St. Louis Medical Society will be host to the Assembly and has arranged an excellent list of committees who will function throughout the Assembly.

A tentative list of the distinguished teachers and clinicians who will take part on the program may be found on page xl of the advertising section of this *Journal.*

A most hearty invitation is extended to all members of the profession who are in good standing in their State or Provincial Societies to be present. A registration fee of $5.00 will admit each member to all the scientific and clinical sessions.

For further information, write Dr. W. B. Peck, Managing-Director, Freeport, Illinois.

The International Organization Against Trachoma.—During the period of the XV Concilium Ophthalmologicum to be held in Cairo from December 8 to 14, 1937, there will be sessions of The International Organization Against Trachoma.

On December 9th there will be a meeting of the present Executive Committee; this will be followed by a plenary meeting of the Delegates from the National Ophthalmological Societies, together with the subscribing Members of the International Organization Against Trachoma.

The program of the scientific sessions is as follows.

1. Introductory address by the President, Dr. MacCallan.

2. The microbiological etiology of trachoma: Reporters, Dr. Phillips Thygeson (U.S.A.); Professor Dr. Grüter (Germany); Professor Dr. Oguchi (Japan); Drs. Cuénod and Nataf (Tunisia); Dr. Rötth (Hungary); Dr. Poleff (Morocco).

3. The pathology of trachoma: Reporters, Dr. Wilson (Egypt); Professor Dr. Michail (Rumania); Professor Dr. Mulock-Houwer (Dutch East Indies); Professor Dr. Pascheff (Bulgaria).

4. The treatment of trachoma: Reporters, Dr. Sobhy Bey (Egypt); Dr. Shimkin (Palestine).

5. Independent communications: Professor Dr. Motegi (Japan), "The epidemiology of trachoma in Japan"; Dr. Lijo-Pavia (Argentina), "Trachoma among school-children in Buenos Aires"; Dr. Ayberk (Turkey), "Trachoma in Turkey."

Royal College of Physicians and Surgeons of Canada

TRANSACTIONS OF MEETING OF COUNCIL, OTTAWA, JUNE 21, 1937 (ABSTRACTED)

Fifteen members of Council were present and important measures were discussed and decided.

The dates for 1937 examinations were set as follows: Written Examinations:

September 23, 1937 — Anatomy, Medicine, Surgery.

September 24, 1937 — Physiology, Medical Pathology, Surgical Pathology.

September 25, 1937—Clinically applied Anatomy and Physiology, Medical.

September 25, 1937—Clinically applied Anatomy and Physiology, Surgical.

These Written Examinations will be conducted by Invigilators, and synchronously in Halifax, Quebec, Montreal, Toronto, Winnipeg, Saskatoon, Edmonton and Vancouver.

The Oral and Clinical Examinations will be held in Montreal on Monday, October 25th.

Examinations conducted in the French language will be held in Montreal and Quebec upon the same dates as detailed above.

A full staff of examiners has been appointed to conduct the examinations in both languages.

The disadvantages of holding the examinations in the autumn, and alternately in Montreal and Toronto are fully recognized by Council and careful study is being made of an alternative arrangement.

In the meantime Council resolved that in 1938 the Oral and Clinical examinations should be held in Winnipeg as at least one centre.

Ad Eundem Fellowship was granted to Dr. Bernard Willinsky, Toronto, Division of Surgery; Dr. John B. Ewing, Kingston, Division of Surgery; Dr. W. Ford Connell, Kingston, Division of Medicine.

The Committee on Specialists presented a report which advanced this project of the certification and registration of Specialists. Communication was received from the Canadian Medical Association requesting the Royal College to undertake this task. Council of the Royal College has accepted the responsibility and proposed to the Canadian Medical Association the setting up of a joint General Committee and joint subcommittees representing each recognized specialty. The joint subcommittees will recommend to Council of the Royal College the details of qualification required for certification and registration.

Dr. W. G. Penfield, of Montreal, has been elected to Council to fill the vacancy caused by the untimely death of Dr. F. A. C. Scrimger.

Council prepared the following slate of nominations for election of Councillors this summer: Drs. W. A. Jones, Kingston; K. A. MacKenzie,

Halifax; G. L. deBellefeuille, Montreal; Harold Little, London; Heber C. Jamieson, Edmonton; M. P. A. Vallée, Quebec; F. S. Patch, Montreal; W. G. Penfield, Montreal; Frederick Etherington, Kingston; B. G. Bourgeois, Montreal; Dr. Chas. Vezina, Quebec; J. G. MacDougall, Halifax; J. S. McEachern, Calgary.

The amendment to the By-laws adopted by the Annual Meeting of 1936 and authorizing an annual levy of Ten Dollars for a period of five years has resulted in the collection to date of August 1st of $2,870.00, a substantial contribution to the working funds of the College.

A letter was read announcing the consent of His Gracious Majesty King George VI to become the Royal Patron of the College.

Decision was made to reprint the By-laws of the College and this reprint will probably take the form of an Annual Handbook with Register of the Fellows.

Book Reviews

The Practitioner's Library of Medicine and Surgery. Vol. II, Eye, Ear, Nose and Throat. 1126 pages, illustrated. Price $10.00. D. Appleton-Century Co., New York and London, 1937.

Inasmuch as the author considers that most of the recent advances have been made by the comparatively younger men in these specialties he has chosen them to be the contributors to the present volumes, two of them practising in Canada. Such minor operative work as may judiciously be performed by the general practitioner is described in detail. This book is printed on good paper; the composition gives ready sequence, and the illustrations are clear and well-placed. It would be a good book for the man doing a busy practice.

The value of 1 per cent optochin ointment in the prevention and treatment of pneumococcic infections is dwelt on. Acute iritis is not always due to tuberculosis. Its cause should be determined and the proper treatment instituted early. All foreign bodies in the chambers should be removed, although those in the posterior chamber often remain there with impunity. Glycerite of Tannin is the best solution for chemical burns, but it has not any greater effect on ammonia burns than the usual copious washing with water.

In the section of Physiology and Histopathology of the Ear the claim is made that, all mucous membranes lining the nasal and aural passages and cavities being similar histologically, it is to be expected that all recurrent upper respiratory infections will eventually involve them all unless they are prevented from so doing by adhesions; these adhesions prevent full functional recovery. The factors involved are the bacterium, the early paralysis of ciliary action, the œdema of submucous and subepithelial tissue, and the type of bone infected (pneumatic or its two incompletely developed grades, diploic and sclerotic). Early x-rays have a prognostic as well as therapeutic value. The surgical dictum "drainage for the relief of tension" applies fully.

Two per cent ephedrine sulphate or hydrochloride in normal saline is recommended in conditions manifesting nasal discharge, and, the author insists on intermittent negative pressure with sinusitis. He is in favour of autogenous and stock vaccines. Maxillary sinusitis is often present in babies who have rhinitis. He is careful to recognize the allergic element in sinusitis, by search for eosinophilic polymorphonuclear cells. Hyperplastic sinusitis is usually allergic in origin. Better results would be obtained in sinus surgery if the public and general practitioner would realize the allergic element present; allow minor operative measures on post-operative cases, and have all cases treated for a full three months subsequent to operation.

Operative Surgery. J. S. Horsley, M.D., LL.D., F.A.C.S., Attending Surgeon, St. Elizabeth's Hospital, Richmond, Va., and I. A. Biggar, M.D., Professor of Surgery, Medical College of Virginia. Fourth ed., 1387 pages. Two vols., price $15.00. C. V. Mosby, St. Louis, 1937.

This work was first published in 1921. A second and third edition have appeared since. Each of these was in one volume and the senior author wrote the texts. The edition under review is in two volumes and the extension has required a sharing of responsibility, so that Professor Biggar's name appears as associate author. The other contributors are men of distinction in their own specialties who have written on neurological surgery, urology, plastic surgery and orthopædic surgery.

The impression left by the earlier editions of sound teaching, strongly marked by the individuality of the author, is carried forward into the more ambitious fourth edition. The authors constitute a "school" of surgery, in the sense that personal experience is, very evidently, the ground work and most of the frame of the structure. When a group of serious minded teachers with a wealth of opportunity behind them combine their efforts the result is bound to be good. The new work on the surgery of the chest by Professor Biggar is a valuable contribution and the chapters on plastic surgery are excellent.

The authors expressly state that the work is not encyclopædic, but a one-page discussion of intestinal obstruction does not appear to be adequate, even though strangulation of bowel is considered under hernia. The new vogue for partial resection of the stomach has evidently not been adopted as the ideal treatment for duodenal ulcer. The older methods of gastroenterostomy and pyloroplasty are given full prominence. Time alone will tell if the new is to supplant the old.

The young surgeon who chooses this system will find it helpful and informing. The bibliographical references are well chosen, so that the source of information is indicated when more detail on a given subject is desired.

Pre-operative and Post-operative Treatment. Robert L. Mason, A.B., M.D., F.A.C.S., Assistant in Surgery, Massachusetts General Hospital. 495 pages, illustrated. Price $6.75. W. B. Saunders, London and Philadelphia; McAinsh & Co., Toronto, 1937.

This book is written by a surgeon for whom physiology ranks as a fundamental with anatomy and pathology. He believes that the ideal surgeon is a good physician who is keenly aware of the value of close association with the internist. Thorough study of the patient reveals any disturbance of function that might be corrected before operation or be a guide in the selection of anæsthetic and a warning of possible complications during and after the surgical procedure. The physiological principles involved are thoroughly discussed, and a most useful application of these principles to post-operative care of the patient is convincingly presented. Such conditions as acidosis and alkalosis with their symptomatology and the biochemical methods necessary to establish their diagnosis are clearly summarized. The treatment follows logically upon the indications. A similar method is applied to other sequelæ of

operation such as œdema and pulmonary complications and ileus. The chapter on burns is a perfect summary of our knowledge of the physiological upset caused by extensive destruction of the skin, and the use of aniline dyes in combination is given preference over tannic acid in a well balanced argument.

The second part of the book deals with the care of the patient before and after operations of specific type. The discussion of preparation and post-operative care in thyroid disease is very thorough, and the special methods applicable to urological and orthopædic problems are very satisfactory as are those after gynæcological operations.

The book is to be recommended to surgeons generally, but particularly to those who teach. As a *vade mecum* to hospital residents it should be invaluable.

Clinical Roentgenology of the Cardiovascular System. Hugo Roesler, M.D., Associate Professor of Roentgenology, Temple University. 342 pages, illustrated. Price $7.50. Charles C. Thomas, Springfield and Baltimore, 1937.

This publication should be of great assistance to all radiologists, and is well worthy of a place in their working libraries. The clinician will find it of great value as it not only brings to his knowledge the application of all the recent radiological advances which have been made in this field but also correlates in a concise manner the physical and x-ray examinations.

Beginning with the preface, which includes a beautiful poem by Thomas Gale, 1586, commencing "Go forth my painefull booke", there is not a page which is void of interest; all contain material productive of much stimulating thought. To enumerate the various chapters would be superfluous, and though it might be unfair to the balance of the book to mention any one particular chapter or chapters yet those which are devoted to kymography and peripheral vascular disease are noteworthy, as they give a clear description of these new and less known developments.

Such a book should have a wide distribution. It should prove to the profession, if such proof were still necessary, that the radiologist is something more than one who takes pictures, that his position is that of a highly specialized scientist who is indispensable to modern medicine.

Diseases of the Nose, Throat and Ear. I. Simson Hall, M.B., Ch.B., F.R.C.P.E., F.R.C.S.E., Surgeon to the Royal Infirmary, Edinburgh, etc. 423 pages, illustrated. Price $3.00. Macmillan Co., Toronto, 1937.

This book is primarily designed to meet the needs of the medical student and the busy medical practitioner. It deals with the conditions that are commonly met with and not those so rare that the ordinary practitioner would be unlikely to recognize them. A brief account is given of the equipment necessary for examination and the methods in use. A short anatomical description precedes each section, and there is some reference to physiology. A useful appendix concludes the work, dealing with the preparation of patients for operation, head light baths, and giving formulæ.

While necessarily sketchy, the book seems to meet its purpose sufficiently well. It can be recommended.

Physical Therapeutic Methods in Oto-Laryngology. Abraham R. Hollender, M.D., F.A.C.S., Associate in Laryngology, Rhinology, and Otology, University of Illinois College of Medicine. 442 pages, illustrated. Price $5.75. C. V. Mosby, St. Louis; McAinsh, Toronto, 1937.

This is a veritable encyclopædia of physical therapy in its most modern application, consisting of 24 chapters, with contributions from 11 different authors. In the main the subject is covered thoroughly, but the book contains some irrelevant parts, namely, the chapter on endoscopy. By the use of recent appliances a fresh estimation of the value of this procedure in certain specific conditions is clearly detailed and well outlined. The book's greatest value is for the practising physician, but it must be kept in mind that scientific evidence is lacking for the over-enthusiasm of some of the authors in coming to rather startling conclusions which should have been more carefully weighed, thereby enhancing the value of the volume.

The pages of the book are full of interesting points, and it is not too much to say it cannot fail to satisfy its purchasers and reward its readers.

Trauma and Disease. Edited by L. Brahdy, B.S., M.D. and S. Kahn, B.S., M.D. 613 pages, illustrated. Price $7.50. Lea & Febiger, Philadelphia, 1937.

The relationship between trauma and disease is of the greatest interest, and yet is obscured by lack of sufficient careful observation. Ask the average practitioner what relationship there may be between trauma and pulmonary tuberculosis, for example, and he will either ridicule the idea or else recall cases in which the evidence of such relationship was at least suggestive. And yet, there is no one source to which we can look for any sort of summing-up of the matter. The authors of the present book have attempted to fill this gap, and have brought together, through different contributors, a large mass of observations which help to clear up contentious points. In neurosyphilis, for example, it is concluded that the rôle of trauma has not been established on a scientific basis. In acute appendicitis it is quite clear that trauma may be the sole or main cause. Malignancy cannot be regarded as due to a *single* trauma. On the other hand it is clear that an unsuspected tumour may readily precipitate an accident which will appear to be the cause rather than the result.

The book is useful for reference, if only to show how extremely difficult it is exactly to evaluate the relationship between trauma and disease. It should tend to increase careful observation in the matter.

Endocrinology, Clinical Application and Treatment. A. A. Werner, M.D., F.A.C.P., Assistant Professor of Internal Medicine, St. Louis University School of Medicine. 672 pages. Price $8.50. Lea & Febiger, Philadelphia, 1937.

Dr. Werner displays an intimate personal knowledge of endocrinology. While an extensive bibliography is an important feature of any modern medical text, nevertheless it is impossible for the practitioner to interpret the numerous and the frequently contradictory findings in experimental endocrinology. Therefore, the paragraphs under the headings: Discussion, Comment and Conclusions, which occur frequently throughout the book, are of great value to the reader because they give him the benefit of the author's clinical interpretation at the end of a brief review of the recent literature in each instance.

After four introductory chapters dealing with the autonomic nervous system, calorimetry, glands in general, known and postulated hormones, the author devotes a separate chapter to each of the important endocrine glands, in which the anatomy and the physiology is lucidly discussed, followed by case reports showing the effect of hypo- and hyper-function. A brief outline of the comparative anatomy and the embryology of each gland showing the purpose for which these organs became specialized would greatly enhance the description.

It is perhaps a little unfortunate that the author has stressed the name "theelin" throughout when dealing with œstrogenic substances. While Dr. Doisy, the original discoverer of œstrone, chose to give it the name theelin, yet for the sake of simplicity everyone

is agreed that scientists and commercial houses should eventually agree on one terminology. The terminology recommended and largely adopted is œstrone (theelin), œstriol (theelol), œstradiol (di-hydro-theelin) and the benzoate of œstradiol.

On the whole, one can unhesitatingly endorse the book as an outstanding guide in a subject which is of the first importance to both the general practitioner and the specialist.

Juvenile Paresis. William C. Menninger, M.D. 199 pages. Price $3.00. Williams & Wilkins, Baltimore, 1936.

The most striking feature of this monograph is the painstaking thoroughness of the presentation. Not only is every aspect of this interesting, though fortunately rare, disease thoroughly discussed from the writer's findings in a large series of cases individually studied, but the literature has been well searched and the findings of others presented, thus giving a much wider survey than would otherwise be the case. The author's style is crisp and simple, although the endeavour to avoid discursiveness has led to a perhaps unavoidable factual overcrowding, somewhat overpowering at times. Amongst several commendable features should be mentioned the really valuable summaries at the end of each chapter, together with the absence of the customary bewildering and often superfluous statistical charts. Separate allusion should be made to the presence of a really excellent chapter on the psychopathological features of the disease a vitally important angle all too often neglected in presentations of so-called organic disease. In conclusion, this monograph may be recommended without qualification as an excellent reference book for those interested in the vagaries of syphilis, more particularly in its neuropsychiatric manifestations.

The Endocrines in Theory and Practice. Articles republished from *British Medical Journal*. 278 pages. Price 9s. net. H. K. Lewis, London, 1937.

The more one sees of books on endocrinology the more one feels that they should be short rather than long, and the less one finds this desire fulfilled. The accumulation of fact, and the tendency for theory to creep in, make it very difficult for the general practitioner to assimilate the one or properly to assess the other. Therefore it is that the series of essays under review is of special interest. The opening chapter alone, by Sir W. Langdon-Brown, on "The Present Position of Endocrinology" is a most stimulating and clearly written review, with a masterly summing-up (in a few paragraphs) of the main known facts. From then on the book is devoted to a series of short articles on the various endocrine organs and the problems connected with them, both clinical and laboratory. The contributors are all men of well known ability in this field, and the result is an exceedingly complete and yet compact survey of modern knowledge of endocrinology.

What is Osteopathy? Charles Hill, M.A., M.D., D.P.H., Deputy Medical Secretary, British Medical Association, and H. A. Clegg, M.A., M.B., M.R.C.P., Deputy Editor, *British Medical Journal*. 217 pages, illustrated. Price 7/6 net. Dent & Sons, London, 1937.

This book should interest both practitioner and layman. The medical man needs a clear account of what he is apt to find difficult to define, and the layman should welcome a dispassionate statement of facts. Probably one of the most striking characteristics of osteopathic statements is their haziness, even fogginess. Listen for example to A. T. Still, founder of osteopathy, explaining the association between dislocation of the femur and diabetes, locomotor ataxy and rheumatism: "I found that a dislocation of the head of the thigh bone . . . would produce tightening of the muscles and flesh in that region and stop the venous return, producing congestion, stagnation, fermentation and varicose veins of the whole limb . . . I find that fermentation extends to the degree of inflammation; that the inflammatory process will extend from the hip-joint to the occiput, producing most all of the effects known as neuralgia, sciatica, lumbago, hardening and stiffening of the spine. I think I am talking to intellects who know the difference between fanciful words and demonstrated facts." But he was quite clear in what he felt about certain things. He was undoubtedly a religious fanatic; he hated alcohol, as he hated all drugs, and was genuinely distressed by the number of morphine addicts in America, many of whom he believed began their habit through carelessness of doctors in prescribing the drug.

But what, after all, do we learn about osteopathy? One thing is clear; the osteopath is not in the group of "bonesetters". Sir Herbert Barker, most famous of all these, repudiates any claim to osteopathy. Even this book, with all its tolerance and care to seek out the facts and set them forth clearly, leaves little but the impression of a cult founded by a mystic, and carried on by men who are mystics only in their accounts of disease. Nowhere is the childish crudity of the osteopath more clearly shown than in giving evidence on medical matters, as in the inquiry before the House of Lords on the occasion of the proposed Osteopaths Bill. Many extracts from this are given in this book.

The book should be widely read. The introduction by Mr. H. G. Wells alone is a delight. He does not spare us, but even though he speaks plainly and fairly (always with more sanity however than his mischief-loving friend, Mr. Bernard Shaw) he can only conclude that osteopathy, as a system of medicine, is impudent balderdash, that is, apart from its manipulative aspect. This is where our teaching in surgery should take its cue.

Diet and High Blood Pressure. I. Harris, Honorary Physician, Liverpool Heart Hospital. 196 pages. Price $3.50. Longmans, Green & Co., Toronto, 1937.

High blood pressure, with its concomitants of arteriosclerosis and nephritis, is a common condition, one which, owing to the wear and tear of modern life, is becoming commoner. This little book, written by a specialist in heart disease, is based on actual research. It was written not for the sick but for the well, and there is no doubt that it will be helpful for those who will heed its precepts. Unfortunately, when we are well we do not feel the need for a physician, but, yet, in the case of high blood pressure prevention is inestimably better than treatment, for cure there is none. Those who are aware of a family tendency to heart disease, nephritis, or high blood pressure would do well to get this book. Following its precepts may add years to their lives. The subject is presented logically and in simple language, sometimes dogmatically, but always effectively. The physiological processes of the body are dealt with sufficiently fully, and much good advice is given as to the proper conduct of life, and the paramount importance of food is insisted on. Sample diets are given, with many useful recipes, which are applicable to those suffering from high blood pressure as well as to those who are well but yet, at the same time, may be potential candidates for trouble. Physicians will find this a useful book to put in the hands of certain of their patients.

Weight Reduction and Dishes. E. E. Claxton, M.B., B.S., D.T.M.&H. 199 pages. Price $2.50. Macmillan Co., Toronto, 1937.

This is a clearly and attractively written account of modern dieting methods in weight reduction. There are some interesting introductory comments on famous cases of obesity. It is shown that with care and strict attention reduction of weight can usually be effected without any of the hardships that rigid dieting is supposed to entail. Diets and food tables are given, and more than half the book is devoted to kitchen recipes. The book is of considerable value in general practice.

Normal Diet and Healthful Living. W. D. Sansum, M.D., Chief of Staff of Sansum Clinic, Santa Barbara, R. A. Hare, M.D. and Ruth Bowden, B.S. 243 pages, $2.00. Macmillan, Toronto, 1936.

This book of 233 pages, written for the layman, sets forth in a very readable manner the latest information on human nutrition. In it are presented most of the established facts in a language that can be understood by all. It can be recommended without hesitation to those who take a real interest in the subject and are willing to take the time and mental energy to study it carefully.

The Psychology of Eating. L. R. Wolberg, M.D., Psychiatrist at King's Park State Hospital, New York. 321 pages, $3.00. R. M. McBride, New York, 1936.

This book is another of those popular expositions by a psychiatrist designed for the edification of the man in the street-car. It belongs to the genus of volumes by other workers on the fringe of medicine which purport to tell the layman how to win friends and become a magnetic personality after life has begun at forty. In spite of that fact, the book is sometimes interesting and often amusing. The author traces the eating habits of mankind from prehistoric times to the present. The last hundred and fifty pages are devoted to directions for reducing weight together with innumerable recipes and menus. "Nostrums and Quackery", of the American Medical Association, is freely drawn upon in the chapter devoted to fake reducing methods and food faddists. A very extensive bibliography on dietetics and a good index are appended.

The Basis of Clinical Neurology. S. Brock, M.D., Associate Professor of Neurology, College of Medicine, New York University. 360 pages, $4.75. William Wood, Baltimore, 1937.

The author has prepared a book that fills a need, in that a tremendous amount of recently acquired, useful neurology is collected and arranged in one volume. However this very wealth of carefully condensed and selected material has the undesirable effect of rendering the book rather difficult to read. The index is necessarily inadequate, not meeting the requirements of a reference work.

The material covered consists almost entirely of the physiology, anatomy and pharmacology of the nervous system with an adequate consideration of the "mechanical" or "focal" aspects of clinical neurology. Several subjects that are "basic" in neurology, such as "metabolism" and "epilepsy", are only touched upon in passing. Such omissions or condensations are the most noticeable because those subjects the author chooses to discuss in a formal manner bespeak his ability both as a clinician and writer.

One is of the opinion that could the author include a few chapters concerning the development, cellular anatomy, and the pathology of the nervous system this book would be popular with the profession. The work would then cover a definite field and the word "clinical" in the title would perhaps be clearly justified.

Practical Methods in Diagnosis and Treatment of Venereal Diseases. D. Lees. Third ed. edited and revised by R. Lees, M.B., F.R.C.P., Assistant Medical Officer for Venereal Diseases to Edinburgh Royal Infirmary. 608 pages, illustrated, $4.50. E. & S. Livingstone, Edinburgh, 1937.

This work is a complete presentation of the subject, more especially diagnosis and treatment, and yet is not voluminous. It is easily read and contains nearly one hundred excellent illustrations; most of those dealing with cutaneous manifestations of syphilis are in colour. Of special value are the appendices. One supplies a complete pharmacopœia of mixtures ordinarily used in the treatment of both genorrhœa and syphilis; a second gives the chemical nature, trade names, manufacturers and dosage of arsenical and bismuth products used in syphilis; and the last a list of treatment centres for venereal diseases in the larger centres throughout the world. The work should be useful to both students and practitioners. It is a tribute to the memory of the late David Lees and one will find in it the same inspiration that one did in his clinics.

Electrocardiography. C. C. Maher, B.S., M.D., Assistant Professor of Medicine, Northwestern University, Chicago. Second ed., 254 pages, illustrated, $4.00. William Wood, Baltimore, 1937.

In this excellent book the author has attempted to improve his monograph by including the advances made in the field in the past two years, and by rearranging some of the subject matter in more standardized form. His book is clearly and concisely written, and is exceedingly well illustrated. Its pages are replete with practical illustrations of the use of the electrocardiograph in practice. No one could read it through without gaining a practical knowledge of the use of the electrocardiograph, and the interpretation of the electrocardiogram. To both the student and the practitioner this book is recommended as a guide and reference in the application of electrocardiography as an aid in evaluating the cardiac status of a patient.

A Textbook of Embryology. H. E. Jordan, Ph.D., Professor of Histology and Embryology, and J. E. Kindred, M.A., Ph.D., Associate Professor of Histology and Embryology, University of Virginia. Third ed., 613 pages, illustrated, $6.50. D. Appleton-Century, New York, 1937.

This being a new edition of a well-known textbook, a detailed review seems unnecessary. As stated in the first paragraph of the preface, "Major changes in this edition concern the correction of a number of typographical and a few factual errors retained in the second edition, the substitution of a number of new illustrations for relatively less helpful figures of the earlier editions, and textual additions under the topics of hæmopoiesis, lymphatics, lung, sex determination, and anomalies. There are also numerous minor changes and additions."

Though not above criticism, this is on the whole a good, well-illustrated presentation of the subject and may be recommended.

BOOKS RECEIVED

The Spectacle of a Man. John Coignard. 252 pages, $2.50. Jefferson House, New York, 1937.

University of Pennsylvania Bulletin. No. 13. Contributions from the William Pepper Laboratory of Clinical Medicine.

Personal Hygiene. C. E. Turner, M.A., D.P.H., Professor of Biology and Public Health, Massachusetts Institute of Technology. 335 pages, illustrated, $2.75. McAinsh, Toronto, 1937.

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